Coyote Creek Reach 3

Mitigation and Monitoring Program

Cities of San Jose and Milpitas
Santa Clara County, California

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

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SECTION 1. MITIGATION AND MONITORING PROGRAM FOR COYOTE CREEK, REACH 3

EXECUTIVE SUMMARY

The Santa Clara Valley Water District (Water District) has applied for a Department of the Army authorization to construct a portion of the Coyote Creek Flood Control Project along a 2.5-mile section (Reach 3) of Coyote Creek between State Route (SR) 237 and Montague Expressway in Santa Clara County. Reach 3 is divided into two portions, designated as Reach 3A, Stations 577+00 to 634+00, and Reach 3B, Stations 566+00 to 577+00 and 634+00 to 696+00. This project is being processed pursuant to the provisions of Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) and Section 404 of the Clean Water Act (33 U.S.C. 1344).

The purpose of the proposed project is to provide 100-year flood protection along Coyote Creek in the Cities of San Jose and Milpitas, California. Flooding on Coyote Creek within the project area has been a recurring problem since the early 1900s. Severe flooding during the winters of 1982 and 1983 damaged hundreds of private and public facilities by inundation.

The Coyote Creek project, divided into Reaches 1, 2, and 3, is located along the lower portions of Coyote Creek in the northeastern portion of Santa Clara Valley, extending approximately 7 miles from the southern tip of San Francisco Bay to the Montague Expressway. The Water District completed construction of Reaches 1 and 2 (San Francisco Bay to SR 237) between 1985 and 1992. Construction of Reach 3A by the Water District and Reach 3B by the U.S. Army Corps of Engineers (Corps), Sacramento District is planned in 1994 and 1995.

I. PROJECT DESCRIPTION

The Coyote Creek Project has evolved through a series of engineering and environmental studies by the Water District and the Corps. In 1984, the Water District prepared an Engineers Report and Environmental Impact Report (FEIR) for the Coyote Creek Planning Study, San Francisco Bay to Montague Expressway (Water District, 1984). The Water District then applied for a Section 404 permit for the first phase of construction in Reach 1, prompting the Corps, San Francisco District, Regulatory Branch, to prepare the Coyote Creek Flood Control Proposal Final Environmental Impact Statement (FEIS) in January, 1987, which evaluates the flood control project in Reaches 1, 2 and 3 (Corps, 1987). In 1988, the Corps, San Francisco District, finalized the Interim Feasibility Report and EIS, Coyote Creek and Berryessa Creek (FR/EIS). A detailed description of the Authorized Project Plan covering Reaches 2 and 3 of Coyote Creek is included in the FR/EIS (Corps, April 1988). Refinements made to project plans and new information on fisheries, cultural resources, and hazardous waste were described in the Corps's Final Environmental Analysis (FEA), Proposed Refinements to the Coyote Creek Flood Control Project (Corps, 1993).

Recently, the Water District incorporated another modification to the project referred to as the meander alternative. Under this modification, the location of the east levee approximately 1,000 feet upstream of SR 237 (between Stations 590 and 595) will be moved to the outboard side of the existing levee to avoid the cutting off and filling of an existing meander. This alternative will reduce the impacts of the project to riparian forest by 1.6 acres, and therefore also will reduce the mitigation acreage by 3.8 acres.

This Mitigation and Monitoring Program (MMP) encompasses Reach 3 of Coyote Creek, and does not provide detailed information on the already constructed Reaches 1 and 2. Many project features discussed in this mitigation plan are included in previous environmental documents and are incorporated by reference to the appropriate environmental document.

A. Location of Project

Reach 3 of the Coyote Creek flood control project extends approximately 13,700 feet from just downstream of the SR 237 bridge to about 100 feet upstream of the Montague Expressway bridge (see Figure 1).

B. Brief Project Summary

The project has two earthen levees offset from the existing channel, with an excavated overflow channel. Access roads will be incorporated along the tops of the levees and at the base of levees at some locations. In Reach 3, the overflow channel will be located primarily on the west side of the creek corridor, crossing the creek at one location approximately 1,000 feet upstream of SR 237. Existing levees and vegetation will be removed and the channel banks lined with rock for approximately 350 linear feet at this crossover point. A utility pipeline for reclaimed water will be placed underneath the overflow channel and creek in Reach 3A at a location upstream of the crossover structure.

Some concrete and rock lining will be required to prevent erosion of the creek banks at the SR 237 and Montague Expressway bridges in Reach 3B. At the SR 237 bridge, a concrete-lined channel section with grouted rock lining transitions will be constructed, with a low-flow channel and baffles to facilitate fish passage through this section. The east bank of the creek upstream of Highway 237 will be lined with rock riprap for an additional 825 feet; this bank will not be grouted. Grouted rock lining will be placed at the Montague Expressway bridge.

An extensive riparian and wetland revegetation program is included to replace vegetation lost as a result of flood control facilities construction. A Habitat Evaluation Procedures (HEP) analysis conducted by the United States Fish and Wildlife Service (USFWS) in 1987 for the FR/EIS found that planting of 32.5 acres of middle and upper terrace riparian vegetation in Reaches 2 and 3 would adequately compensate for the loss of 13.6 acres of riparian habitat and loss of attendant wildlife habitat. Since impacts of the project under the meander alternative have been reduced by 1.6 acres, the mitigation program for riparian forest has been reduced by 3.8 acres. The 3.8 acres is calculated as the reduced area of impact (1.6 acres), by the mitigation ratio established by the HEP analysis (2.4:1).

In Reach 2, 12.2 acres of riparian forest have already been planted as part of the mitigation program. In Reach 3, 16.5 acres of riparian forest will be revegetated within seven sites. These sites are shown on Figure 2 Mitigation Area, and on Plates 1-4, Proposed Revegetation Sites and Significant Features. In addition to these 16.5 acres of riparian forest revegetation, other mitigation plantings are setback areas (approximately 2 acres), streambank shade and cover for fish (approximately 2,510 linear feet), rocked streamside areas (½ acres), and seasonal wetlands (0.4 acre). These plantings are described in Section II, Riparian Mitigation and Monitoring Program.

Mitigation features specific to fisheries include replacement of spawning gravels, Washington baffles under SR 237, a low-flow channel in the concrete lined and rocked portions of the channel, and boulder clusters at the crossover area to provide additional rocky riffle habitat. These mitigation features are described in Section III, Fisheries Mitigation and Monitoring Program.

C. Responsible Parties

The permit applicant for Reach 3 is the Water District. The Water District will be responsible for construction of the flood control project in Reach 3A. If a local cooperation agreement is approved, the Corps, Sacramento District, will be responsible for construction of Reach 3B, and for implementation of the revegetation plan for all of Reach 3. The Water District will take over responsibility for monitoring and maintenance of the revegetation areas 2 years after installation.

This MMP was prepared by CH_2M Hill, with assistance from the Habitat Restoration Group (HRG), and the Coyote Creek Riparian Station (CCRS), and was reviewed by the Water District. The original plan contained in the General Design Memorandum for this project was reviewed by the Corps, Sacramento District, and the Corps headquarters in Washington.

D. Required Permits

The following permits are required from environmental resource agencies for the project:

- A Corps Section 404 Dredge and Fill Permit is required. USFWS, the National Marine Fisheries Service (NMFS) and the State Historic Preservation Officer (SHPO) comment on the 404 permit.

- Consultation with the Endangered Species Office of the USFWS was completed during preparation of the GDM and FEA.

- A California Department of Fish and Game (CDFG) 1601 Streambed Alteration Agreement is required to modify impacts to the bed, banks, and channel of Coyote Creek.

- A Regional Water Quality Control Board (RWQCB) National Pollutant Discharge Elimination System (NPDES) Notice Of Intent (NOI) is required for dischargers of storm water associated with construction, as well as a Section 401 certification.

E. Summary of Project Impacts

Information contained in this subsection is summarized from previous environmental documents (Water District, 1984; Corps, 1988 FR/EIS, 1987 FEIS, and 1993 FEA). Project impacts that were identified in the FR/EIS and FEIS are referred to as those impacts discussed under the Authorized Project Plan. Project impacts either not identified in these two original environmental documents or modified to accommodate project design changes and additional information are referred to as the Refined Authorized Project Plan and are contained in the FEA. The FR/EIS and FEA evaluated these impacts and requisite mitigation for Reaches 2 and 3 as a whole and did not provide separate evaluation for Reaches 2 or Reach 3 or subportions thereof.

Project impacts judged in the EIR, FR/EIS, FEIS, or FEA to be potentially significant include:

- Loss of 13.6 acres of riparian vegetation along Reaches 1, 2, and 3. With the meander alternative, the loss of riparian vegetation has been reduced to 12 acres.
- The creation of permanent gaps in the riparian corridor at crossover areas, with attendant impacts to wildlife migration along the creek corridor.
- Loss of cover, feeding, and spawning habitat for fish, including steelhead and chinook salmon spawning habitat.
- The creation of a potential barrier to fish migration at the SR 237 bridge, by construction of a 690-foot long concrete apron.
- The potential impacts to a National Register eligible archaeological site near Tasman Drive.
- Disturbance of potential hazardous waste sites.
- Loss of seasonal wetland habitat in the seasonal wetlands.

1. *Effects on Riparian and Wetlands Vegetation*

According to the FR/EIS, 13.6 acres of riparian vegetation would be lost, including 14.5 percent of the trees in Reaches 1, 2, and 3. In Reach 3, six permanent gaps will be created at the crossover and at bridge locations, and construction of levees will remove a portion of two seasonal wetlands that form in borrow pits along the west bank of Coyote Creek south of SR 237. Under the meander alternative, the area of riparian vegetation lost has been reduced to 12 acres.

2. *Effects on Wildlife Habitat*

Substantial riparian vegetation is found on both banks of Coyote Creek, forming a riparian corridor that represents one of the most valuable wildlife habitats in Santa Clara Valley. The moderate to dense cover and shrubby understory provides nesting, feeding, and resting habitat for wildlife. The USFWS designated the Coyote Creek habitat as a Resource 2 Category resource, with the attendant goal of no net loss of habitat from project implementation (Corps, 1987). The HEP analysis concluded that the revegetation program will provide new habitat for those species that survive the initial construction impacts. Floodway habitat provided by the overflow channel will replace upland and agricultural land that is dominated by non-native plant species. Similar to Reach 2, the created overflow channel area will be a buffer area of low-stature vegetation adjacent to the revegetation sites that will provide valuable wildlife habitat for numerous bird species.

3. *Effects on Fish and Aquatic Resources*

Construction of the flood control project will generate impacts on existing fisheries resources. The degree of the adverse impacts will be directly proportional to the amount of riparian vegetation and channel substrate disturbance incurred throughout the project reach. Impacts to fisheries and aquatic resources identified during preparation of the EIR, FR/EIS, FEIS, and FEA are summarized below. After preparation of the FR/EIS, the Fisheries Evaluation Report commissioned by the Water District revealed the presence of steelhead and salmon spawning and rearing habitat in the reaches of Coyote Creek affected by the project. Mitigation for impacts to this newly discovered habitat have been developed in coordination with USFWS and CDFG. The impacts are outlined as follows:

- Loss of riparian vegetation could lead to increased water temperatures, affecting rearing habitat value.
- Loss of riparian habitat could also lead to loss of cover for juvenile fish in the crossover areas.
- The concrete-lined section under SR 237 could interfere with anadromous fish passage during high flows.
- Construction would cause the loss of spawning riffles and potential spawning riffles in Reach 3.
- Additionally, short-term impacts on spawning from sediment deposition and water temperature increases could occur during construction, and longer term discharge of sediments could occur from slope erosion at locations where vegetation breaks occur.

4. *Effects on Endangered Species*

The federally-listed peregrine falcon (*Falco peregrinus*) has been observed foraging in Reaches 2 and 3. The saltmarsh yellowthroat (*Geothlypis trichas sinuosa*) and tri-colored blackbird (*Agelaius tricolor*), identified by the USFWS as Category 2 candidates for listing, are known to utilize riparian vegetation along Coyote Creek. There is evidence that the saltmarsh yellowthroat breeds in a small, localized area near the meander in Reach 3 (Rigney, 1993). Impacts to foraging and perching habitat for the peregrine falcon will be mitigated through implementation of the revegetation plan. Loss of potential nesting habitat for the saltmarsh yellowthroat and tri-colored blackbird will be mitigated through the revegetation plan and seeding of the overflow channel.

The California red-legged frog (*Rana aurora draytonii*), recently proposed for listing as endangered, was observed during 1984 field surveys of Reach 3 (Water District, 1984). The foothill yellow-legged frog (*Rana boylii*) and the western pond turtle *(Clemmys marmorata)*, federal Category 2 Candidate species, were also observed in Reach 3 (Water District, 1984). Subsequent environmental documents that discuss detailed fisheries and aquatic surveys do not report further sightings of these species in Reach 3.

5. *Effects on Cultural Resources*

Only one site has been identified that has been deemed by the State Historic Preservation Officer (SHPO) to be eligible for listing on the National Register of Historic Places: a prehistoric archaeological site (CA-SCl-675) discovered as part of a survey for the Tasman Drive Extension EIR. This site cannot feasibly be avoided since project redesign in this area would not allow the reach to function in a hydraulically acceptable manner. The Corps Sacramento District has begun the consultation process under Section 106 of the National Historic Preservation Act with SHPO and the Advisory Council on Historic Preservation. The Water District will be a participant in the Section 106 consultation process and a cosignatory to any resulting Memorandum of Agreement.

This archeological site potentially could extend into areas that will be revegetated. Since this site is buried approximately 7-10 feet below the soil surface, revegetation activities will not damage its integrity. In addition, no deep trenching will be allowed in the vicinity of this site.

6. *Hazardous, Toxic, and Radioactive Waste*

Five areas of contamination were found in Reach 3 as a result of Water District investigations (Corps, 1993). Of these, two sites located in proposed revegetation sites were determined to have contamination levels that could present a potential risk during grading and construction activities. One of these was an oil and grease contaminated area on the east bank, and the second is an area of pesticide contamination on the east bank. These sites, judged to be potentially hazardous, have undergone cleanup and removal of contaminated soils. Implementation of these measures have adequately mitigated these potential impacts, and no further mitigation will be necessary.

7. *Effects on Recreation*

Since 1986, Coyote Creek from just north of the Montague Expressway to its mouth has been shown to be a part of the Bay Trail Master Plan (County of Santa Clara, 1993). The FR/EIS concluded that no significant impact to recreation would occur from the flood control project, since this document described recreational features such as trails that could be incorporated into the offset levee design as compatible with flood control facilities. The FR/EIS did not, however, include any specific plans for creating recreational facilities, and currently, no plans regarding recreation use in Reach 3 have been finalized.

F. Jurisdictional Areas to be Filled

Approximately 4 acres of jurisdictional waters and wetlands will be affected by the project in Reach 3. These consist of:

- The waters and wetlands upstream of SR 237 where rock riprap will be placed against approximately 350 linear feet on both banks at the crossover area and approximately 650 feet on the east bank;

- The waters and wetlands located between Stations 690+00 and 696+00 near the Montague Expressway bridge, where the existing channel will be rock lined;
- The waters and wetlands between Stations 566+00 and 580+00 near SR 237 that will be lost due to construction of the concrete-lined section and its rock-lined transitions; and
- Portions of the waters and wetland areas of the two seasonal ponds located in the overflow channel.

G. Types, Functions, and Values of the Jurisdictional Areas

In Reach 3, wetlands occur between the open flowing water of the creek and the upper portions of the existing levees. Gravel and sand bars within the creek provide substrate for emergent marsh vegetation and other wetland plants that grow above the low-flow channel.

The vegetation community within the Coyote Creek corridor has been characterized in detail in past environmental analyses; the creek supports one of the most extensive mature riparian forest in the San Jose area. For most of the creek, mature cottonwood (*Populus Fremontii*) and sycamore (*Platanus racemosa*) form a canopy over shrub and herbaceous strata. Shrubs, such as California blackberry (*Rubus ursinus*), and smaller trees (e.g., willows [*Salix* spp.] and box elder *[Acer negundo* var. *californicum*]) grow from near the base of the levee slopes to the top of the existing levees. Herbaceous species growing close to the active water channel include spreading bentgrass (*Agrostis stolonifera*), dotted smartweed (*Polygonum punctatum*), fragrant goldenrod (*Euthamia occidentalis*) and a few cattails (*Typha* spp.). In intermediate elevations (midway up the levee from the creek), mugwort (*Artemisia douglasiana*) and rough cocklebur (*Xanthium strumarium*) are prevalent.

Coyote Creek wetlands provide high quality habitat value for riparian species and other wildlife species that use the riparian corridor as foraging, hunting, nesting, and breeding habitat. The open flowing waters of the creek provide aquatic habitat for fish species and provide spawning and rearing habitat for steelhead and chinook salmon. An in-depth analysis of the area's value as a riparian and fisheries habitat was included in the FR/EIS and the FEA. Coyote Creek wetlands also provide flood control and storm water conveyance functional values, and at some times of the year, the surface waters of Coyote Creek recharge groundwater in the vicinity.

The limit of jurisdictional waters was determined to be the elevation of the ordinary high water (OHW) line, calculated as the 2.3-year probability discharge of 1,500 cubic feet per second. No adjacent wetlands were identified within the levees that extended beyond the limit of OHW.

Two jurisdictional areas have formed in abandoned, man-made borrow pits south of SR237. Portions of the northern pit have been determined by the Corps to be jurisdictional waters and portions of the southern pit have been determined to be jurisdictional wetlands. The total acreage of jurisdictional area within these ponded areas is about 4 acres. Vegetation in the northernmost depression is comprised of herbaceous non-natives, including marsh timothy (*Phalaris* sp.) and Russian thistle (*Salsola kali*). In the southern depression, herbaceous species includes seaside heliotrope (*Heliotropium curassavicum*) and rabbitsfoot grass (*Polypogon monspeliensis)*, with a few willows growing to form patches of a shrub vegetation layer.

SECTION 2. RIPARIAN MITIGATION AND MONITORING PROGRAM FOR COYOTE CREEK, REACH 3

I. MITIGATION GOALS AND OBJECTIVES

A. Revegetation Goals and Objectives

The goals of the revegetation effort along Lower Coyote Creek are to replace riparian habitat and seasonal wetland habitat lost due to flood facilities construction; provide shade and hiding cover for fish species; and provide erosion control and weed control within the overflow channel and levee banks. Habitat lost by the flood control project will be replaced with no net loss. Areas to be revegetated fall into five categories:

1. Riparian habitat replacement plantings totaling 16.5 acres in Reach 3;
2. Rocked streamside plantings at the crossover in Reach 3A, where the overflow channel crosses from the west side to the east side of the existing channel, and the rocked east bank upstream of SR 237;
3. Setback areas, defined as narrow strips between the overflow channel or new levee and the existing riparian vegetation that are not already part of a revegetation area, such as occur at the upstream end of the west bank;
4. Streambank shade and cover plantings for fishery mitigation in areas where existing vegetation near the creek is more open; and
5. Jurisdictional habitat (waters and wetlands) to replace the area lost in the two excavated depressions.

Objectives of the revegetation effort are:

- Establish 16.5 acres of diverse, native riparian vegetation along Reach 3 adjacent to the remaining existing riparian vegetation to replace lost wildlife habitat, such as foraging habitat, nesting sites, cover, and perches.
- Revegetate the benches incorporated into the rocked structures at the crossover area and east bank upstream of SR 237 to develop a continuous band of vegetation providing low cover for wildlife species moving along the creek corridor.
- Establish riparian vegetation in setback areas along Reach 3 as an additional buffer to the existing riparian corridor.
- Provide erosion control and weed control by revegetating the overflow channel and levees with desirable species.
- Provide streambank shade and cover plantings along Reach 3 to minimize water temperature increases and replace overhead cover.

- Create waters and wetland habitat to replace the jurisdictional area filled within the excavated depressions in Reach 3A. The main function of this habitat is to provide seasonal bird resting and feeding habitat.

- Promote the rapid development of riparian midstory, overstory and understory vegetation in order to create a dense canopy and cover of vegetation.

- Introduce plant species appropriate to the project area that are presently lacking or under-represented, adding to the plant diversity.

- Maintain the genetic integrity of the native riparian plants by planting native species that have been locally collected.

- Plant native riparian stock, install irrigation, implement weed control efforts, and maintain the site and its immediate surroundings using methods that will maximize the survival of the planted stock, fulfillment of success criteria, and minimize maintenance effort and expense.

- Implement a statistically sound monitoring program for vegetation and wildlife that fulfills regulatory requirements; minimizes data collection and analysis efforts; allows for integration of wildlife and vegetation variables; and, based on findings, incorporates flexibility into the long-term revegetation plan.

B. Types of Habitat to be Created

Habitats to be created include:

- Jurisdictional Habitats (Waters and Wetlands), to be created in the mitigation areas adjacent to the existing seasonal ponds;

- Riparian Forest Habitat, to be developed in three types of planting areas: Riparian Forest Revegetation Sites, b) Riparian Setback Areas, and Streambank Shade and Cover Plantings.

- Rocked Streamside Habitat, to be created in the benches of the rocked crossover and east bank upstream of SR 237;

- Herbaceous cover to be created in the overflow channel and on the levee slopes.

1. Jurisdictional Habitat (Waters and Wetlands)

Jurisdictional habitat will be created within the overflow channel area, in low areas constructed as mitigation for the partial loss of the existing seasonal ponds. Actual jurisdictional area to be filled by levee construction is less than anticipated in the FEA, totaling approximately 0.4 acres. Created jurisdictional habitat will consist of areas of seasonal wetlands and jurisdictional waters adjacent to existing jurisdictional areas. Seasonal wetland areas will be comprised of open areas with facultative plant species, primarily forbs and grasses. Jurisdictional waters will consist of open areas that possess soils that are saturated to the surface or pond for more than 7 days. Because these ponds will be located within the overflow channel, vegetation cannot exceed a height of 3 feet above the level of the overflow channel, and use of shrubs will be restricted.

The existing southern pond is surrounded by milk thistle (*Silybum marianum*), and the northern pond is covered with Russian thistle (*Salsola kali*) later in the season when the soils dry out. Both of these are highly undesirable non-native species, and weed control within those ponds will be included as part of the mitigation program.

2. *Riparian Forest Habitat*

Riparian Forest Revegetation Sites. The riparian forest revegetation sites will be planted with a mix of plant species typical of the riparian vegetation that occurs within the project region. Tree species will include Fremont and black cottonwood, sycamore, red willow (*Salix laevigata*), buckeye (*Aesculus californica*), and valley and coast live oaks (*Quercus lobata, Q. agrifolia*). Elderberry, box elder, arroyo willow (*Salix lasiolepis*), coyote brush (*Baccharis pilularis*), California rose (*Rosa californica*), California blackberry, virgin's bower (*Clematis ligustifolia*), and mugwort will comprise the dominant understory vegetation.

Riparian Setback Areas. The setback areas are primarily 15- to 20-foot-wide sections on the inboard side of the overflow channel or new levee which will serve as buffers and extensions of the existing adjacent riparian vegetation. Riparian vegetation planted in the setback areas will be similar to the vegetation planted in the Riparian Forest Revegetation Sites described above, with an emphasis on native species under-represented in the vicinity.

Streambank Shade and Cover Areas. Riparian tree species, primarily cottonwood and willow, will be planted in narrow strips immediately adjacent to the creek. These plantings will improve habitat for fish by providing increased shade and overhanging cover at the creek's edge. Details regarding the species composition of this habitat type and implementation methods are included in this subsection. See Section III, Fisheries Mitigation and Monitoring Program, for a detailed discussion of other fisheries issues.

3. *Rocked Streamside Habitat*

Two areas which will have rock riprap placed along the streambank will be designed with 15-foot wide benches near the water in which soil will be placed and low vegetation will be allowed to grow (see Figure 4, Crossover Area Planting Detail). The crossover area will have a bench approximately 350 feet in length on each side of the creek. Upstream of SR 237, an approximately 650-foot length of the east bank will contain a similar bench. For these areas, the goal is to develop a riparian substory to facilitate the movement of animals through breaks in the riparian corridor without restricting flood flows. Native plant species to be planted in this area must not exceed 3 feet in height above the level of the overflow channel. Since the level of these benches will be several feet lower than the bottom of the overflow channel, bench vegetation will actually be able to grow as much as 6 feet in height.

4. *Herbaceous Cover Areas (Levee Slopes and Overflow Channel)*

The primary goal of this habitat type is to provide erosion control and aid in providing weed control. However, as observed in Reach 2, the overflow channel area will provide a secondary function of providing some wildlife habitat. Species to be seeded in these area include a mixture of native forbs and grasses, but may also include noninvasive plant species that are not native to the area but provide exceptional erosion control.

C. Functions and Values of Habitats

1. *Jurisdictional Habitat (Waters and Wetlands)*

As described above, the existing jurisdictional habitat formed in abandoned, manmade borrow pits and includes areas of uplands, wetlands, and jurisdictional waters. The sparse vegetation found in these ponds is dominated by non-native species, with the exception of portions of the southern pond, where a few native species occur.

Because these depressions fill with local runoff in the spring of some years, and form seasonal ponds, they support some wetland vegetation and provide nesting and feeding habitat for waterfowl and shoreline birds during the period of time that they are ponded. These ponds probably do not perform significant groundwater recharge or water quality improvement functions. These ponds retain water in the winter, albeit a small amount, and therefore they may assist with flood control in the vicinity.

The primary function and value of the seasonal wetland mitigation area will be feeding and resting habitat for bird species in the spring. Current observations of the existing ponds suggests that the unvegetated portions of the northern pond fulfill the feeding habitat requirement better than the vegetated areas in the southern pond. For this reason, revegetation of the seasonal wetland will be limited to seeding with low growing native species such as meadow barley (*Hordeum brachyantherum*), and toad rush (*Juncus bufonius*).

2. *Riparian Forest Habitat*

According to the HEP analysis, the functions and values of the existing riparian habitat and the riparian forest to be created are primarily resting, nesting, foraging, and hiding cover for wildlife. The existing riparian forest along the lower reaches of Coyote Creek is considered to be some of the highest quality riparian forest remaining in the southern San Francisco Bay region. The riparian corridor is dominated by mature riparian trees such as Fremont cottonwood, red willow, and sycamore, and includes other riparian shrub and herbaceous species such as arroyo willow, box elder, buckeye, clematis, California wild rose, and California blackberry. This riparian forest provides high quality habitat values for a number of wildlife species, including mammals, reptiles and amphibians, and both resident and migratory birds.

While the created forest habitat is developing, it will provide a diverse, multicanopied structure that with valuable resting and hiding cover for numerous wildlife species. The young, rapidly growing foliage of the young plantings will attract insects that supply food to migratory neotropical bird species and other wildlife. As it matures, the revegetated forest will provide thermal relief for a variety of wildlife species; foraging habitat for raptor species such as the peregrine falcon; cavities in mature trees for woodpeckers; a vegetated buffer zone that will assist in reducing erosion and sediment transport to the creek; and shade to the creek.

A total of six plant associations are planned in order to create a diverse mosaic of plant communities that will provide rapid growth of vegetation in the short term for insectivorous neotropical bird species; resting, hiding, and perching cover for a variety of birds; and structural diversity in the long term that will ultimately create a variety of niches suitable for many wildlife species.

The plant associations and the proportion of these associations planned for each revegetation site were selected based on criteria that include site-specific constraints and are linked to project goals. Past revegetation efforts along Coyote Creek have specifically identified restoration of habitat suitable for migratory bird species as a project goal. For the Reach 3 project, the goal for the revegetation has been further refined to support neotropical migrants and resident insectivorous birds. These bird species derive maximum habitat value from a multilayered canopy that is dominated by rapidly growing, dense foliage that attracts a high number and wide variety of insects (Rigney, 1993). In the planting plan developed for this MMP, the placement of tall and medium layered canopies has been intermixed to maximize the structural diversity of canopy types. In wide sites, or in sites adjacent to areas that contain little high quality existing riparian canopy, a high proportion of the two plant associations containing tall canopy is included. In narrow sites, or those that suffer extreme sun and wind exposure, a high proportion of plant associations with medium canopy vegetation is interspersed with a lower percentage of tall canopy to maximize structural diversity. A low canopy of small shrubs, vines, and herbaceous species is planned for all sites, in order to provide increased structural diversity, cover, and a source of food for wildlife.

Cottonwood Plant Association. This is a rapid growing forest type which will provide dense growth of foliar canopy that will support numerous insects, a food source to neotropical birds. This plant association is dominated by Fremont cottonwood (50 percent), with subdominant trees being red willow (30 percent), sycamore (10 percent), and valley oak (10 percent). In general, this plant association is planned for the most mesic areas within the revegetation sites that have less exposure to sun and wind; those areas with the highest groundwater levels; and in areas that have clayey inclusions.

Sycamore/Oak Plant Association. This plant association is dominated by sycamore (60 percent), with subdominant trees comprised of valley oak (20 percent) and coast live oak (20 percent). This plant association is planned for sites that are drier, may be more exposed to sun and wind, and areas that contain gravel and sand lenses. This plant association will provide a relatively open canopy; maximum benefit to wildlife will occur once the trees reach a height to support raptor nesting or cavity nesting by species such as woodpeckers.

Willow Scrub Plant Association. Both red and arroyo willow are codominants, comprising 40 percent each of this plant association, with mulefat *(Baccharis salicifolia [viminea])* the subdominant component (20 percent). This plant association is characterized by very dense, midlevel canopy vegetation, that produces a large amount of foliage attractive to insect species. As a result, it will provide both dense cover for wildlife and a valuable food supply for neotropical bird species. This plant community is rapid growing, but it will be overtopped by cottonwoods in a few years.

Box Elder/Elderberry Plant Association. The box elder/elderberry association is characterized as a medium canopy that is dominated by two shrubs, box elder and elderberry (40 percent each). In addition to these two species, buckeye *(Aesculus californica)* is present as a subdominant (20 percent). Both box elder and elderberry are rapid growing shrubs that provide a dense foliar canopy that will support a high number of insect species. This plant association is particularly valuable in that it provides a variety of food sources for bird species throughout the year. Spring migrants are attracted to insects that occur on the buckeye as it breaks bud early in the spring; later, other birds are attracted to the dense canopies of box elder and elderberry in late spring, and finally to the supply of elderberries produced in late summer and early fall.

Blackberry/Rose Plant Association. This plant association is comprised of four species, all of which are codominants in equal proportions (25 percent). These species are California wild rose, blackberry, snowberry, and clematis. This plant association is characterized as a low growing, dense understory, suitable for providing an impenetrable area useful for hiding cover, attracting insects, and providing berries, a valuable food source. These four species have been combined into an association as they compliment each other structurally. The rose is useful as a support for the blackberry and clematis vines to climb over and obtain maximum height. The snowberry provides a low growing, shade tolerant cover, and fills in low gaps within this plant association. Over time, the clematis will climb up nearby trees and shrubs, and fill in openings in the mid canopy. In Reach 2, numerous bird nests have been observed anchored in this vine (Rigney, 1993).

Coyote Brush Scrub Plant Association. This plant association is dominated by two low growing shrub species, coyote brush and California sagebrush (40 percent each). One perennial herbaceous species, wild licorice *(Glycyrrhiza lepidota)* is present as a subdominant in this association (20 percent). This low growing plant association is more tolerant of extreme site conditions, and is planned for dry areas that have maximum wind and sun exposure. This plant association provides structural variety and dense hiding cover suitable for a variety of bird species.

Herbaceous Plant Association. The herbaceous plant association is comprised of a suite of seven relatively low growing perennial species. This association is dominated by mugwort (25 percent), western goldenrod *(Euthamia occidentalis)* (20 percent), and creeping wildrye (*Leymus triticoides*) (20 percent). Subdominant species include Douglas' baccharis (*Baccharis douglasii*) (15 percent) common aster (10 percent) and Indian hemp (*Apocynum cannabinum)* (10 percent). This plant association will provide a dense cover of low growing vegetation useful in providing structural diversity, as hiding cover, a source of food and nectar for insects and birds, and as a soil binder, providing erosion and weed control.

Streambank Shade and Cover Planting Habitat. Plantings within this habitat type will be comprised of tree and shrub members of the cottonwood, willow scrub, and box elder and elderberry plant associations. Species to be planted will include: cottonwood, red and arroyo willow, box elder, and elderberry. Because the primary goal of this habitat type is to provide vegetative cover and shade the creek, only species that provide dense foliar canopy have been included.

3. *Rocked Streamside Habitat*

For rocked streamside areas, the goal is to develop a vegetated substory to facilitate the movement of small wildlife species through breaks in the riparian corridor without restricting flow in the overflow channel. Species planted in this area will include western goldenrod, mugwort, and Douglas' baccharis. (see Figure 4, Crossover Area Planting Detail).

4. *Herbaceous Cover Areas (Levee Slopes and Overflow Channels)*

The proposed overflow channel and levee banks are not existing habitats, therefore no reference can be made to existing functions and values of these habitat types. The proposed seeding of the levee banks and overflow channels will provide two functions: erosion control and reduction of undesirable weed seed sources adjacent to the other mitigation areas. As seen in Reach 2, the creation of this habitat type adjacent to the revegetation sites will provide a large area of resting, nesting, and foraging habitat for wildlife species such as sparrows.

D. Time Lapse

1. *Jurisdictional Habitat (Waters and Wetlands)*

The jurisdictional habitat being replaced formed in abandoned borrow pits and should not take many years to replace. The mitigation area will not need to be fully vegetated to provide for feeding and resting habitat for birds, and the time lapse for providing bird habitat is expected to be less than 5 years.

2. *Riparian Forest Habitat*

The HEP analysis conducted by the USFWS for the FR/EIS was based on a 100-year replacement period. For target bird species such as neotropical migrants and insectivorous resident species, the riparian habitat will start providing habitat value as soon as 5 years, as it has in the pilot revegetation site in Reach 2. Over time, the mix of plant associations included in the riparian forest habitat will develop a greater variety of wildlife niches. As trees mature in 20 to 50 years, they will develop cavities for nesting birds. Streambank shade and cover plantings are expected to develop a dense canopy within a few years, providing a mesic environment for amphibians, shade to the creek, and overhanging vegetation for fish.

3. *Rocked Streamside Habitat*

The rocked streamside plantings will develop into a dense, low vegetation as hiding, resting, and feeding cover within 2 to 3 years.

4. *Herbaceous Cover Areas (Levee Slopes and Overflow Channel)*

Seeding of the overflow channels and levee slopes is expected to provide erosion and weed control benefits in the first year. As observed in Reach 2, the overflow channel area will provide habitat for bird species such as song sparrows by the second year and will provide nesting habitat in 3 to 4 years.

II. FINAL SUCCESS CRITERIA

A. Target Functions and Values

1. *Jurisdictional Habitat (Waters and Wetlands) Success Criteria*

The created jurisdictional habitat must meet two success criteria: (1) the dominant vegetation present within the created seasonal wetland must be comprised of 50 percent or greater plant species classified with a wetland indicator status of Obligate, Facultative Wet, or Facultative (+) and (2) the created seasonal wetland and jurisdictional waters must meet the hydrology criteria as defined in the Corps 1987 Wetlands Delineation Manual. These created jurisdictional areas are not expected to develop soils that will exhibit mottling and other hydric soils indicators in the first 5 years. Because non-native hydrophytic plant species occur within the seasonal wetland, species-specific success criteria are not proposed for the seeded areas other than fulfilling the Corps criteria for hydrophytic vegetation. The created seasonal wetland area must also fulfill the Corps hydrology parameter, meaning these areas must be possess soils that are saturated to the surface or pond for more than 7 days. These analyses will also be conducted on the remaining undisturbed ponds to be used as a reference site.

2. *Riparian Forest Habitat Success Criteria*

Short-Term Success Criteria. Trees and shrubs planted within the riparian forest habitat must meet the following success criteria: by year 5, ~~all planted stock (trees and shrubs) must have either 60 percent survival combined with a vigor classification of fair or greater, or~~ the revegetation sites must have an average absolute middle to upper canopy cover of 45 percent or greater (see Table 1, Plant Vigor Classification). ~~Further,~~ no individual revegetation site will have less than 50 percent survival. ~~In addition to these success criteria, the Water District may have interim standards that will be applied to the contractor, and replanting of stock may occur prior to year 5.~~
Year 5 success criteria will not be considered to have been met until at least 2 years after the last major human intervention (i.e. replanting or irrigating).

Long-Term Success Criteria. At year 10, the average absolute middle to upper canopy cover of trees and shrubs must show a steady trend towards 70 percent or greater, and no less than 50 percent absolute middle to upper canopy cover of trees and shrubs species is to occur in any revegetation site.

Revisions from Corps permit (201785 12, Sep 6, 94) ~~adequate~~ ~~(see notes re revision to Table 1)~~ Also see Corps 1994 permit ~~regarding nonintervention period of 2 years.~~ additional revisions re monitoring year 1-4 based on a combination of survival & vigor as described on p. 33) and extension of 5-yr period under extraordinary adverse conditions.

3. *Rocked Streamside Habitat Success Criteria*

By year 5, all plantings in the rocked benches must meet a success criteria of 70 percent absolute plant cover or greater.

4. *Herbaceous Cover Areas Success Criteria (Levee Slopes and Overflow Channel)*

This habitat type is not intended as a native plant community, nor is it intended to provide any specific wildlife use. The primary goal of this revegetation is to provide erosion control during the first few years; therefore, no performance criteria are proposed.

B. Target Hydrological Regime

Only the jurisdictional habitats (waters and wetlands) have a target hydrological regime, since most of the other areas are upland areas with vegetation supported by soil moisture and groundwater. The jurisdictional habitats must pond or be saturated to the surface for a minimum of 7 days in years when the remaining ponds are also ponded or saturated for at least 7 days.

C. Target Jurisdictional Acreage to be Created

New jurisdictional acreage consists only of the 0.4 acre seasonal wetlands. The majority of the riparian plantings will not occur in jurisdictional areas, and streambank shade and cover plantings will occur in areas that are already jurisdictional.

III. PROPOSED MITIGATION SITES

A. Location and Size of Mitigation Area

1. *Jurisdictional Habitat (Waters and Wetlands)*

Approximately 0.4 acres of jurisdictional habitat will be created within the upland portions of the northern and southern ponds (see Figure 3, Limit of Jurisdictional Waters and Wetlands at the Crossover Area). Within the northern pond, a total of 0.1 acres of jurisdictional waters will be created, and within the southern pond, a total of 0.3 acres of seasonal wetlands habitat will be created.

2. *Riparian Forest Habitat*

Riparian Forest Revegetation Planting Locations. Under the meander alternative, 16.5 acres of riparian forest revegetation area is required in Reach 3. Sites 3 through 9 total 26.6 acres (see Table 2, Riparian Mitigation Site Acreages and Locations). Surplus mitigation acreage will be reserved for mitigation plantings for future projects in the Coyote Creek watershed. Five of the Reach 3 revegetation sites (3, 4, 5, 8, and 9) are located adjacent to the west side of the existing riparian corridor, between the riparian vegetation and the edge of the overflow channel (see Plates 1-4, Proposed Revegetation Sites and Significant Features). The two remaining sites (6 and 7) are located on the east side of the creek, between existing vegetation and the proposed new levee.

Riparian Setback Area Location. The setback areas totaling approximately 2 acres in Reach 3 are primarily adjacent to the existing west bank between Site 8 and Montague Expressway (Stations 657+00 to 689+00) (see Plates 1-4).

Streambank Shade and Cover Planting Locations. Approximately 2,510 linear feet of streambank shade and cover planting has been identified. Most of these 15- to 20-foot wide areas are located near the downstream edge of Reach 3A.

3. *Rocked Streamside Habitat Planting Locations*

The rocked streamside habitat planting areas consisting of approximately ½ acre are found in the northern portion of Reach 3 at the crossover and the eastern bank upstream of SR 237 (see Figure 2).

4. *Herbaceous Cover Areas Planting Locations (Levee Slopes and Overflow Channel)*

The overflow channel is to be constructed primarily on the west side of the creek with levees constructed on the east and west side of the creek. The overflow channel will cross from the west side to the east side of the creek at the crossover area. The overflow channel bottom and levee slopes are shown in Plates 1-4, and cover approximately 46 acres and 25 acres, respectively.

B. Ownership Status

All the revegetation sites will be located within the Water District's right of way. For those areas not owned in fee, the Water District will have easements to install and maintain the flood control project, including revegetation sites in perpetuity. Owners include:

- Santa Clara Valley Water District
- City and County of San Francisco
- City of Milpitas (pump stations)
- County of Santa Clara (west bank, near SR 237)
- State of California (Agnews Developmental Center)
- City of San Jose
- Sakauye et al.

C. Existing Functions and Values of Mitigation Area

The mitigation areas designated for riparian forest habitat types primarily consist of cultivated areas, some of which are now ruderal fields dominated by weedy non-native species. In general, these provide some limited wildlife habitat value, but represent a large source of weed seed to the existing riparian corridor. Adjacent to Coyote Creek, a dense riparian canopy is present, however, beneath this canopy are non-native plant species such as periwinkle, rice grass, and German ivy. The areas which will be used for mitigation of the seasonal ponds contain numerous non-native species such as milk thistle and Russian thistle late in the season.

D. Present and Proposed Uses of Mitigation Area

The larger riparian revegetation sites are presently cultivated or are abandoned fields which are currently covered by ruderal vegetation. Proposed uses are limited to providing riparian and jurisdictional habitats, with the jurisdictional areas within the overflow channel having a primary function in allowing passage of flood flows. The riparian revegetation sites are located in areas that will not need to be maintained to provide flood flow passage. Plantings in the rocked streamside areas must not exceed 3 feet above the elevation of the overflow channel. Vegetation within the overflow channel must not interfere with the passage of flood flows.

E. Jurisdictional Delineation

A delineation of jurisdictional wetlands and waters within the project area was conducted in July, 1993 by CH_2M Hill and HRG biologists. The jurisdictional area delineated consists of areas along the creek within the OHW line located within the existing levees, and the seasonal ponds located in Reach 3A, about 1,000 feet south of SR 237. Detailed mapping of those areas is found in the Waters and Wetlands Report, submitted with the Corps Permit Application, August 1993. Most of the proposed revegetation areas are not within the limits of jurisdictional areas.

Only streambank shade and cover plantings near the existing creek in more open areas will be located within existing jurisdictional areas. Proposed seasonal wetlands to be constructed will be created in uplands areas only.

F. Present and Proposed Uses of all Adjacent Areas

Adjacent areas outside the project footprint are a mixture of agriculture, residential, business park, and light industrial uses. On the east side, from Montague Expressway to the Tasman Drive crossing, the project is adjacent to existing business parks. These uses are expected to continue in the future. North of Tasman Drive on the east side of the project, agricultural uses dominate outside the existing riparian corridor. These are slowly being replaced by industrial development. On the west side of the project are residential developments, Agnews State Hospital, and the County bus depot. In the future, the outboard side of the revegetation sites will be separated from adjacent land uses by the overflow channel and levees, which will provide a buffer zone for the riparian corridor, and the inboard side will be along the existing levee, riparian corridor, and creek.

Several of the revegetation sites are bisected by transportation or utility corridors. A 20-foot wide gas pipeline easement crosses Site 3. The San Francisco Water Department Bay Division Pipelines are contained within a 80-foot wide right of way in Site 4. Site 5 is bisected by a 145-foot wide overcrossing of the Tasman Drive Extension. Site 6 has one utility line (15-foot width) and one storm drain easement (30-foot width). The setback area has one storm drain easement (15-foot width). Plantings within these corridors may be restricted. Acreages within these corridors have been excluded from that credited to the revegetation sites; however, low shrubs and groundcovers will be planted in these corridors to complement the adjacent revegetation sites.

G. Zoning

Zoning of adjacent properties are industrial (general, research, and development) and business (office, bank, and clinic), on the east side of the creek. On the west side of the creek, zoning is primarily government and multifamily residential, with two parcels zoned as agriculture.

H. Preliminary Site Analysis

1. *Topography and Soils*

The riparian and seasonal wetland sites are relatively flat, with little or no slope, as they are within the alluvial floodplain of Coyote Creek. These sites are situated approximately 11 to 15 feet above the elevation of the thalweg of Coyote Creek.

In general, with the exception of Site 9, surface soils within the revegetation sites may be compacted to varying degrees by agricultural practices and at Site 5 from recreational use of Camp Coyote. In many cases, deep ripping of the revegetation sites prior to plant installation will be required, especially at Sites 3, 4, and Camp Coyote. Site 9 is located inboard of the existing levee, and has not been farmed, and soils in this site are not expected to be compacted. Severe undercutting of the Site 9 creekside slope was observed. On the face of this eroding slope, several holes were noted, and these appear to be utilized by foraging birds. Stabilization of the actively undercutting slope may or may not be possible without disturbing this unidentified species. If it is determined that birds are not nesting in these holes, this slope could be stabilized by grading and planting with materials such as willow wattles if deemed necessary.

The soils in the revegetation sites are fine-textured loamy alluvial soils. In a few areas, soils sampling detected clays and in one area, a loamy sand. Most of the sites are on cropped or previously cropped soils.

Soil samples for laboratory analysis were collected from 14 surface soil samples and 20 shallow and deep soil samples, obtained concurrent with the groundwater and soil boring drilling operations. Site-specific soils tests have been conducted and included soil characteristics such as texture, pH, salinity, organic matter, mineral concentration, and cation exchange capacity. Soil tests indicate that levels of the above lie within what is considered the normal range necessary for plant growth.

In addition to the soil samples, subsurface lithology was investigated by means of deep soil borings. A total of 14 soil borings were taken to maximum depths of between 12 and 23 feet in order to detect the presence of clayey intrusions. Clayey layers were detected at levels approximately 15 feet below ground surface at selected locations in a few of the revegetation sites. In some cases, mature trees were present at locations of clay intrusions, indicating that the presence of the subsurface clay layer does not preclude tree growth.

2. *Climate (Meteorological Data)*

The watershed for Coyote Creek constitutes approximately 350 square miles. The normal annual precipitation in the watershed varies by elevation, with a range of 28 inches at higher elevations to 14 inches on the valley floor. The revegetation sites for Reach 3 are situated on the valley floor. The normal annual precipitation throughout the watershed is about 20 inches per year. Most precipitation occurs between November and March. Prevailing spring and summer winds in the project area are from the northwest and west. The climate is typically Mediterranean, with mild, wet winters and warm, dry summers.

3. *Hydrology and Flooding*

Once the project is constructed, the riparian forest habitats and jurisdictional habitats will be within the areas that will be irregularly to infrequently flooded, when waters overtop the existing creek banks. Ordinary High Water is contained within the existing creek channel, and only the lower portions of the streambank shade and cover planting locations will receive regular inundation. The jurisdictional habitats will pond water from rainfall, and occasionally hold water from flood flows conveyed down the overflow channel. The overflow channel is expected to convey waters for the 2 to 3-year flood event.

4. *Groundwater*

A total of 12 groundwater monitoring wells have been installed throughout the revegetation areas, and ongoing monitoring of wells has been initiated. Groundwater monitoring in November 1993 and February 1994 found that depth to groundwater across all wells ranged between 12.0 feet to 16.5 feet. In general, groundwater levels are highest at the northern end of Reach 3.

Groundwater generally flows subparallel to Coyote Creek, north to San Francisco Bay. Immediately adjacent to Coyote Creek, groundwater appears to flow away from Coyote Creek, suggesting that Coyote Creek is a losing stream during the fall. Spring water levels may reverse this flow direction.

5. *Water Quality*

Field tests on groundwater samples from each groundwater monitoring well were conducted in November 1993 to determine groundwater conductivity, salinity, and pH. Salinity of the groundwater ranged between 1.0 and 1.5 parts per thousand; conductivity of the groundwater ranged between 0.85 and 1.85 millimhos per centimeter; and pH of the groundwater ranged between 7.0 and 7.5. These data show that groundwater in Reach 3 has a neutral pH and moderate salinity; however, this salinity level should not restrict plant growth.

Localized areas of potential soil and groundwater contamination have been found near or within the revegetation sites. Two of these, judged to be potentially hazardous, have undergone cleanup and removal of contaminated soils.

6. *Irrigation Water Sources*

There are several existing wells in the vicinity of the revegetation sites which are supplying adequate supplies and quality of water to existing agricultural activities. These wells, or new wells drilled to the approximate depth of 300 feet or less, may be used to irrigate the revegetation sites. Irrigation water may also be pumped directly from the creek or obtained from the reclaimed water pipeline which is proposed in Reach 3A.

7. *Existing Vegetation*

In general, the floristic composition of revegetation Sites 3 through 8 and the setback plantings area are similar due to the history of disturbance by agricultural practices. One complex of existing structures (barn and associated buildings) is located in Site 4 and adjacent to Site 3 with non-native species typical of landscaped or homestead areas. These include agave *(Agave* sp.), opuntia *(Opuntia* sp.), castor bean (*Ricinus communis)*, and fig (*Ficus* sp.). Site 4 contains a clump of mature cork oaks *(Quercus suber)*, a non-native tree species which will be girdled once the revegetation trees gain 4 to 5 years of height. Sites 5 and 8, on the west bank, and Sites 6 and 7, on the east bank, possess no existing structures and are dominated by non-native annual grasses and forbs.

Revegetation Site 9, on the west bank, is the only site inboard of the existing levee, and is located at a higher elevation than the others. This site is surrounded by mature native vegetation that may protect the site from sun and wind exposure. Non-native species are present; however, native vegetation typical of riparian areas is present as well. Native species present in this area include large colonies of blackberry and Indian hemp and a small location of creeping wild rye and heliotrope (*Heliotropium curassavicum*). Others include small cottonwood saplings, and blue elderberry (some trees to 25 feet tall). Areas within Site 9 that support native species are to be flagged to remain on site.

Ruderal plant species present within Revegetation Sites 3 through 8 include: ryegrass *(Lolium multiflorum)*, slender wild oats *(Avena barbata)*, ripgut brome *(Bromus diandrus*), mustard (*Hirschfieldia incana [Brassica geniculata]*), smilo *(Piptatherum miliaceum) [Oryzopsis miliaceum])*, milk thistle (*Silybum marianum*), mallow (*Malva* sp.), yellow star thistle (*Centaurea solstitialis*), fennel (*Foeniculum vulgare*), and occasional occurrences of bermuda grass *(Cynodon dactylon)*, marrubium *(Marrubium vulgare)*, Himalaya berry *(Rubus procerus)*, tree tobacco *(Nicotiana glauca)*, and Russian thistle *(Salsola tragus)*.

Areas adjacent to Coyote Creek in which streambank shade and cover plantings will occur are generally characterized by a tall canopy of native riparian vegetation, but most sites have a dense cover of non-native species in the lower canopy layer. Non-native plant species observed in these sites include periwinkle, smilo, and weedy annual grass species.

The two seasonal ponds, northern and southern, formed in borrow pits, and have had a history of disturbance. A small amount of native species are present in the southern pond, but both ponds support many non-native plant species during the period of year they are not filled with rainwater. Among the other non-native species, two particularly undesirable species, milk thistle and Russian thistle, comprise much of the low vegetation layer in these areas.

8. *Signs of Animal Damage*

Based on browsing observed in Reach 2 and animal sightings in Reach 3, it is assumed that ground squirrels and rabbits will be the only significant browse animals present within Reach 3. Plant protection will be provided for those species believed susceptible to damage.

IV. IMPLEMENTATION

A. Rationale for Expecting Success

1. *Jurisdictional Habitat*

The existing waters and wetlands formed in abandoned borrow pits. No effort was made to create wetlands in these areas, yet they formed easily on the soils present at the site. The proposed mitigation areas are located immediately adjacent to the existing jurisdictional habitat. Soil pits dug for the wetlands delineation found a dense clay loam layer about 12 inches below the surface of the soil in the northern pond. With excavation of the upland area to the appropriate depth, infiltration of ponded water will be delayed in the mitigation area and wetland hydrological conditions will develop.

The hydrology driving these areas consists essentially of surface ponding due to direct rainfall with minor input from surface runoff. Hydrology in the newly created areas will be driven by the same factors.

2. *Riparian Forest Habitat*

Reach 3 is characterized by a nearly continuous corridor of moderate to dense riparian habitat. While the vegetation in this reach is dominated by cottonwood and box elder, there is a diversity of other species including blue elderberry, sycamore, and black walnut. This vegetation, according to the FR/EIS, represents the middle terrace vegetation that has survived the agricultural and firewood felling which removed most of what originally would have comprised a riparian corridor on a high, naturally-occurring terrace.

The revegetation of riparian forest, riparian setback, and riparian streambank habitats, is being planned in areas that are assumed to have historically supported riparian forests. The revegetation sites currently show several small patches of remnant riparian vegetation, including cottonwoods and willows. Streambank shade and cover plantings are planned in areas that are naturally surrounded by similar vegetation. In addition, planting of riparian trees at the pilot revegetation project and shade sites in Reach 2 have been deemed successful.

3. *Rocked Streamside Habitat*

The rocked bench plantings have been based on the experience gained by the Water District in Reach 2 crossover areas. Although soil initially washed out of the crossover benches in Reach 2A, sedimentation on those benches subsequently allowed planting, and the soil on the Reach 2B crossover benches was successfully retained and planted.

4. *Herbaceous Cover Areas (Levee Slopes and Overflow Channel)*

Species to be seeded in the overflow channel and levee slopes are tolerant of the dry to wet and compacted conditions of these areas.

B. Responsible Parties

The Water District will be responsible for construction of the flood control project in Reach 3A. If a local cooperation agreement is approved, the Corps, Sacramento District, will be responsible for construction of Reach 3B, and for implementation of the revegetation plan for all of Reach 3 with the cooperation of the local sponsor, the Water District.

C. Site Preparation

The first stage of site preparation will be the removal of any structures, rubble and certain exotic trees from the revegetation sites. Ripping to a depth of 2 to 3 feet, and if necessary, discing will be undertaken at all accessible sites. No turning or tilling of soil deeper than 1 inch nor access by heavy equipment will be allowed on the revegetation sites after they are ripped and disced.

Weed control will begin on the revegetation sites in fall of 1994 and continue until the time of planting in fall 1995. This will allow for several cycles of control of both the cool season and warm season weeds. Several techniques will be used to target different types of weeds. These techniques have been chosen to most effectively kill the weeds according to their life cycles and vulnerability. Short, young annual or biennials will be sprayed. Tall annuals or biennials will be mowed or sprayed. Short, young perennials will be sprayed. Tall perennials will be mowed and then sprayed.

In between the weed control periods, irrigation will be applied to the sites as necessary to encourage additional germination of weed seeds in the soil. It is estimated that approximately three rounds of weed control and two rounds of irrigation will be necessary from August through October 1994.

Mowing will cut growth down to 2 inches above the ground surface or lower. The intention of mowing is to either cut off annuals before they seed or to remove bulky growth so that follow-up spraying on regrowth will be more effective.

Herbicide spraying will be used when weed growth (or regrowth) is young and succulent enough for the spray to be absorbed. The type of herbicide will be a nonselective postemergent systemic, although selective herbicides may be necessary for some weeds such as Bermuda grass. Depending on site conditions, herbicide will be applied either by all-terrain vehicle or tractor mounted spray rigs or by spot-spraying from backpacks.

In fall 1994 (late October or prior to onset of winter rains), a winter cover crop will be seeded across selected revegetation sites to control erosion and protect the prepared soil during the winter rainy season, choke out existing weeds, and reduce influx of additional weed seed onto the sites. The winter cover crop will consist of 'Escort' sterile wheat and succulent lupine. This is a sacrifice cover crop which will be mowed prior to planting of the revegetation sites. Alternatively, a light cover of straw will be spread across those revegetation sites where winter weeds are expected to germinate.

Once weeds begin germinating on the revegetation sites in the late winter or early spring, another series of weed control will begin. Mowing and spraying will be used selectively at those locations of the sites where weeds are growing through the winter cover crop or straw. It is estimated that approximately five rounds of weed control and three rounds of irrigation will be necessary from February through August 1995 or the date of plant installation at the revegetation sites. Irrigation will not be necessary until seasonal rains have dropped off.

The site preparation program described above is for the revegetation sites but not for the overflow channel or the levee. The later will be seeded immediately after cessation of construction activities and will consist of excavated and greatly disturbed soils which should contain very little seed bank; therefore, early site preparation for weed control is not necessary.

D. Planting Plan

The revegetation design described below is modeled after the pilot riparian forest project (Site 1 of Coyote Creek) implemented in the winter of 1986 to 1987 and amended by information gained from subsequent Reach 1 and 2 plantings.

1. *Plant Species Lists*

Plant species lists for the riparian habitats, the herbaceous cover areas (the overflow channel and levee slopes), and the rocked bench areas are shown in Tables 3, 4, and 5. Streambank shade and cover plantings are to consist of cuttings of woody tree and shrub species, primarily cottonwood and willow, and also shrubby willows, box elder, and elderberry. Planting of cuttings will occur when the plants are dormant (January and February); plants grown in containers will be installed in the early rainy season, typically between October 1 and December 1. Seeding of the jurisdictional wetland area will be conducted in the fall, to coincide with the onset of early rains. Species to be planted in the seasonal wetland area will include meadow barley and toad rush.

2. *Spacing and Plant Densities*

Since 1986, the Water District has planted approximately 20 acres of riparian vegetation along Reaches 1 and 2 of Coyote Creek. The planting density outlined below is based in part on the results of these projects, as well as recommended planting densities from previous environmental documents. Planting densities recommended in earlier environmental documents included planting trees on 10-foot centers (435/acre) in areas 2 acres or larger or on 8-foot centers (675/acre) in smaller areas (using rectangular spacing) (FR/EIS, 1987). Using triangular spacing equivalents, these rectangular planting densities are equivalent to planting trees on 11-foot and 9-foot centers. Planting densities recommended for herbaceous species and shrubs were 970 plants/acre (approximately 6.8-foot centers, rectangular spacing, or 7.2-foot spacing using triangular spacing). This planting density originally recommended in the EIR is believed to be excessive for these revegetation sites. Some species planted on 6-foot to 8-foot centers in the pilot riparian forest study, particularly the cottonwoods, are overly dense.

Certain fast-growing species, such as cottonwoods, will produce a closed canopy, dense, uniform growth that will crowd out other species and provide less wildlife diversity. These tree species are recommended at lesser overall densities than those originally proposed, preferably on 12-foot to 15-foot centers (triangular spacing). A lower density of shrubs and trees is also recommended, to more closely resemble a natural developing riparian system. The site-specific planting numbers shown in Tables 6-13 represent an intermediate position based on the results and recommendations from the pilot riparian forest study and the more recent plantings in the vicinity.

These planting rates suggest a planting density of 349 trees per acre (with planting basins spaced 12 feet on center, triangular spacing), and 503 shrubs or vines per acre (with planting basins spaced at 10 feet on center, triangular spacing). Herbaceous species will be planted at a density of 621 planting basins per acre (equivalent to 9 feet on center, triangular spacing). All herbaceous species and a few of the shrub and vine species will be installed with three plants per planting basin.

According to these planting densities, the average life form composition of all seven revegetation sites (including the setback plantings) is as follows: 28 percent of total planting basins per acre are comprised of tree species; 52 percent of planting basins per acre are comprised of shrubs and vines (which includes some species that overlap into tall and medium canopy layers); and the remaining planting basins per acre are comprised of herbaceous species (20 percent). The average number of plants per acre (not planting basins) is 1,438 plants per acre. The number of plants per acre ranges among the individual sites from 1,267 plants per acre to 1,568 plants per acre. If the assumed loss of 40 percent of planted stock occurs, the average number of plants per acre remaining will be approximately 900 plants per acre. Although this is about 20 percent less than the densities used in the HEP analysis (FR/EIS), the ultimate densities after the assumed percentage of loss are believed to represent a more typical riparian community in the area.

Streambank shade and cover plantings are to be installed at a higher density than the other two categories of riparian forest plantings. The primary goals of this habitat type are to provide maximum shade for fisheries in order to moderate water temperatures and to provide overhanging cover. A minimum planting density of 2,012 trees and shrubs per acre (5-foot centers, triangular spacing) is recommended for these mitigation areas. Further investigation of the conditions at these sites may indicate that a higher initial planting density and lower survival criteria should be accepted for these sites. In some cases, sites with initial difficult conditions may be acceptable for streambank shade and cover plantings because these sites will ultimately provide the best shade and cover features for fish. Even if many of the initial plantings fail, if they are installed at a high density, enough should survive to provide benefits to fish.

3. *Sources of Plants/Propagules*

All plant source material (seeds and cuttings) will be custom collected from (in order of preference): (1) areas where vegetation is to be removed for the project; (2) other areas within Reaches 2 and 3; (3) nearby areas along Lower Coyote Creek and Guadalupe River; and (4) areas along the upper portions of Coyote Creek or Guadalupe River and their tributaries at the same elevation, within a 30-mile range of the project site. This material may only be supplemented by commercially available native species (not cultivars) where insufficient plant material is available from the aforementioned locations or where collection of plant material is determined to have a negative effect on existing resources. Preparation for stock collection will begin in 1-2 years prior to planting (scheduled for Fall, 1995). To ensure an adequate quality and supply of some cutting stock, coppicing of donor trees and shrubs stems may be required. Seed of some desirable species may not be commercially available and may have to be collected for two seasons prior to planting to meet the required poundage (e.g. wild licorice and western goldenrod). Germination loss and storage criteria for these species should be examined prior to collection.

4. *Propagules/Types of Stock*

The type of propagule selected for Reach 3 of Coyote Creek is based on: (1) the results from the pilot riparian forest study in Reach 2 and (2) results of an additional 15 acres of riparian revegetation installed in Reaches 1 and 2 of Coyote Creek.

Table 14 presents a list of propagule types and a collection schedule, by species, to be used in Reach 3. Plant material will be collected as described allowing sufficient lead time for development of appropriate root mass. Plant material will be propagated for a period of 6 to 12 months. The bulk of planting stock will be installed in irrigated areas from containers, however, some species will be direct seeded or installed as short cuttings depending on site conditions or if nursery-grown stock from a custom collected propagule is unavailable. Some species may be transplanted if sufficient plant material is available within the defined collection area.

5. *Direct Cuttings*

Plant material installed in nonirrigated areas (bank stabilization, streambank locations) will consist primarily of either direct cuttings or seed. All cuttings will be harvested while the plants are dormant, typically in December and January. Cuttings to be installed directly, will be collected and installed within the same day. All cuttings will be kept covered and moist during storage and transport, and may be soaked in clear water for several hours to speed root emergence. The slant end of cuttings may be dipped in rooting hormone immediately prior to installation. A minimum of three nodes on each cutting and ⅓ of the length will be above ground and ⅔ below to ensure rooting success. Cuttings will be 12-18 inches in length (see Figure 5, Installation of Cuttings).

Cuttings collected for propagation in growing containers will be planted immediately after field collection; cuttings used for nursery propagation can be collected outside the December through January window as long as sufficient lead time remains to grow well-rooted plants by the scheduled planting date.

6. *Container Stock*

The bulk of planting stock installed in irrigated areas will be from containers. Plant material will be collected as described in Table 14, allowing sufficient lead time (6 months to 1 year) for development of appropriate root mass. Plant materials will be propagated in pots with internal ridges which prevent roots from circling, including "dee" pots, 1-gallon tree pots (deep pots) or in 1-gallon containers as described for each species. Container plants will be planted directly into native soil, with some species planted three per planting basin (see Figure 6).

7. *Direct Seeding*

Some species will be direct seeded if a restrictive planting location prohibits container installation or irrigation is not available. Mature acorns with no visible damage will be harvested off the tree in the fall and immersed briefly in water; floating acorns will be discarded. Cold storage will be provided for acorns until planting. Acorns and other appropriate seeds will be direct seeded into protective Blue-X tubes.

8. *Deep Planting Holes*

Deep planting holes are planned only for streamside shade and cover areas that are to take place in the existing levees, if soils are highly compacted. Other planting holes will be dug by hand to 14 inches in depth.

9. *Fertilizing*

Fertilizer will not be applied during site preparation, since the nitrogen component of fertilizers stimulates the growth of weeds and the phosphorus component may inhibit inoculation by desirable mycorrhizal fungi.

10. *Plant Protection*

Plants susceptible to browsing by rabbits and ground squirrels will be protected using Blue X for seeds and chicken wire, hardware cloth, or milk carton enclosures (Figures 7 and 8). Milk carton enclosures may be left on and should degrade within two growing seasons. Full or half size milk cartons will be used according to plant size. Hawk perches consisting of 15- to 20-foot 4-foot x 4-foot redwood posts or appropriately sized dead trees or branches may be distributed throughout the sites to encourage predation of ground squirrels and rabbits by raptors.

11. *Weed Control*

All planted species will be protected from weed invasion by use of organic mulch. Mulch will be applied at a depth of 4-6 inches filling a 4-foot planting basin. Mulch will be pulled away to expose the crown of the plant to prevent burial of growing points and/or rotting.

E. Fire, Weed, and Erosion Control Measures in Herbaceous Cover Areas

To decrease the transport of sediment from these areas after construction, reduce the amount of weed species that germinate on these bare slopes, and minimize the fire hazard, overflow and levee areas will be seeded. In addition to the herbaceous cover areas, all other areas of exposed soil that could erode into Coyote Creek or carry sediment off site will be seeded prior to the onset of winter rains.

F. Irrigation Plan

1. *Irrigation System*

Supplemental watering will be required to maximize survival of planted stock but will not be necessary for the streambank plantings, the herbaceous cover areas, or for the seasonal wetland.

The pilot study recognized many common problems that are associated with the utilization of drip irrigation systems (HRG, 1992). Solutions for these problems, as outlined below, will be incorporated into the overall irrigation design plan before implementation.

- Restricted root expansion due to inadequate wetting zones;
- Clogging of drip emitters;
- Damage to drip system distribution tubing by rodents;
- Damage to plants from hot water heated by exposure of the black dripline tubing to the sun;
- Uncoupling of slip-on joints;
- Inability to shut-off individual emitters.

The main irrigation lines will be buried in shallow trenches to minimize ultraviolet damage and heating of water. Individual drip lines will be laid on the ground surface for easy access during maintenance inspections. Mulching or growth of herbaceous cover over individual driplines will help control water temperature. Also, irrigation should begin in the early morning hours (before 8 a.m.), when temperatures are low. Drip emitters will be inspected at least every 2 weeks during the irrigation season.

2. *Irrigation Schedule (Frequency and Duration)*

The ultimate goal is to establish a self-sustaining riparian forest; therefore, every effort will be made to establish the riparian species and remove plants from supplemental water supplies as soon as survival criteria are ensured.

Watering will occur from April through November, extended as-needed in dry years. Supplemental irrigation will decrease at the end of year 2, to wean planted stock, and regular irrigation will not occur in year 3 except on an as needed basis only. Regular inspections outside the April through November irrigation season will be conducted the first year in any 3-week period where no rainfall is received. Each plant will receive a minimum of 5 gallons per irrigation during the first year, increasing to 20 to 30 gallons in the second and third year (if needed). During the first year, watering as often as every 5 days may be needed, with frequency decreasing after the first year.

3. *Water Sources and Water Quality*

Irrigation water for Reach 3 will most likely be pumped from groundwater wells but it could also be supplied directly from the creek, the reclaimed water pipeline, or by water truck. If pumped from the creek or groundwater wells, filters will be required. Water quality tests will be conducted and evaluated before selection of water source is finalized.

G. As-Built Conditions

A report will be submitted to the Corps within 6 weeks of the completion of site preparation and planting. The report will describe the as-built status of the mitigation project. Maps will indicate location of plantings and any other installations or structures.

V. SITE MAINTENANCE

A. Short-Term Maintenance

The short-term plant maintenance period will extend over the proposed 5-year establishment period. Short-term plant maintenance efforts will include pruning; weeding; watering; maintenance of the plant basin, mulch, protection features; plant replacement; and record keeping, as described in greater detail below.

1. *Noxious Weed Control and Maintenance*

Noxious plants (see Table 15) will be eradicated during the 5-year establishment period as necessary to eliminate competition with installed plants. The planting basins will be kept free of weeds which compete for irrigation water and plant nutrients and are detrimental to plant growth. Weeds that grow through the mulch will be controlled by hand or by hoeing. The use of mechanical equipment or appropriate herbicides will be allowed outside the basins.

For the rocked bench areas specifically, non-native weeds within the planting bench should be removed as needed. To prevent obstruction of flood flows, vegetation control will be implemented for any woody material reaching 3 feet in height above the overflow channel.

The contractor may be held to other, more specific weed control standards.

2. *Irrigation System Inspection and Maintenance*

The revegetation contractor will be responsible for overseeing the irrigation operation and ensuring that the specified rate and frequency of supplemental water is adjusted as necessary and is delivered to all planted stock. This includes performing regular inspections of the dripline at least every 2 weeks during the time of year planted stock is irrigated; repairing the dripline system; repairing and inspecting the filter system, including cleaning if the filter is not self-flushing; and running and repairing the pump systems. Selected emitters will be capped off as weaning efforts are initiated by location or species type.

3. *Repair of Basins and Herbivore Protection*

If a basins are used as part of the irrigation design, all berms around basins that become damaged in any manner causing them to lose their water-holding capacity will be repaired. Plant protection devices will be inspected at least monthly and replaced or removed as needed.

4. *Supplemental Planting*

The planting densities designed for this project assume a 40 percent loss. If the short-term success criteria are not met at the end of 5-year establishment period, replanting of stock (also overplanting by 40+ percent) will be required, reinitiating the 5 year establishment period for those plants. All supplemental stock will be replaced during the fall and winter months, from October to December, with the planting window extended to late winter for some species. The contractor may be held to interim standards and replanting of stock may occur prior to year 5.

5. *Stand Thinning or Culling*

If mortality of planted stock is significantly lower than the assumed figure of 40 percent, the planted stands of riparian trees may possess too dense of a canopy cover. This cover may cause growth suppression due to competition for sunlight, water, and nutrients or a predisposition towards insect and disease infestation, and may necessitate the thinning of some trees. All thinning will be done on a tree-specific and site-specific basis.

6. *Schedule of Maintenance Activities*

Maintenance activities will occur as needed during the 5-year establishment period. After this period, maintenance will be continued as necessary. During the 5-year establishment period, irrigation inspections will occur every 2 weeks from April to November, beginning in March to ensure operation of the irrigation system. During the establishment period, mulch and plant protection devices will be inspected for damage concurrent with irrigation system inspection. After the cessation of establishment period monitoring, only limited maintenance of the revegetation sites is anticipated.

General site inspections will occur at least twice annually in years 1 through 5, once at the end of the summer and again at the beginning of the growing season, usually around March. These inspections are broader in scope than the bimonthly inspections, and are to include an overall examination of each revegetation site in order to ascertain if abnormal site conditions are present. Maintenance activities will also be scheduled in years 1 through 5 after any unusual high rainfalls, leading to abnormally frequent or high flows in the overflow channel. The crossover area plantings and streambank plantings will be inspected after any heavy storm event.

7. *Responsible Parties*

The responsible party for implementing the mitigation and monitoring activities is Dr. Bernard Goldner, Environmental Section, Project Development Branch of the Santa Clara Valley Water District. This office is located at 5750 Almaden Expressway, San Jose, California 95118-3686. Dr. Goldner can be reached at: (408) 927-0710.

8. *Reporting of Maintenance Activities*

Documentation of all maintenance activities will be required during the establishment period and summarized information will be incorporated into the annual monitoring reports. The first-year records will include as-built plans, number of plantings by species and type, and locations of plantings by site. All monitoring reports will include summarized information on plant survivorship by species, types of maintenance performed, frequency of activities, irrigation times and dates, and observations of site environmental conditions. The report will include an analysis of the year's growth and plant survivorship and any climatic or other environmental factors affecting these.

B. Long-Term Maintenance Activities

No significant long-term maintenance activities are expected past year 5, since this is planned to be a self-sustaining system. However, yearly maintenance of the monitoring transects may be required. The revegetation areas will be inspected yearly to identify any potentially significant problems, such as large downed trees, or invasion by non-native species that may outcompete the desired flora.

VI. MONITORING PROGRAM

A. Establishment Period Performance Criteria and Monitoring

1. Jurisdictional Habitat (Waters and Wetlands)

Short-term monitoring of the created jurisdictional habitat will include monitoring of wetland vegetation in years 1, 3 and 5, and wetland hydrology in year 5. Qualitative and/or visual observations of hydrology will be made in years 1 and 3. The existing ponds will also be verified at the same time and used as reference sites. It is anticipated that the constructed jurisdictional wetland and jurisdictional waters will meet the vegetation and hydrology criteria for a formal wetland determination by the end of the 5-year period.

If monitoring efforts determine that any of the success criteria have not been met, corrective measures must be taken in order to correct the parameter. This may require regrading of the jurisdictional area, or other measures to be determined by the Water District Environmental staff, and short-term monitoring will be reinstated.

2. Riparian Forest Habitat

A representative sample of all planted stock will be evaluated annually during the establishment period (years 1 through 5) to determine and document how well success criteria are being met. Yearly monitoring is to occur in the fall and is to include an assessment of: survival (trees and shrubs), vigor (trees and shrubs), structure (trees and shrubs), browse (trees and shrubs), regeneration (trees and shrubs only) and percent absolute canopy cover (trees and shrubs). Representative sampling is to be conducted by means of permanent transects, and analyzed on a site by site basis to reduce variability between revegetation sites. The sample sizes recommended below either exceed the minimum sample size values recognized as statistically reliable and capable of being replicated or represent either the entire set or a large proportion of the species included at any specific site.

Survival will be monitored until year 5, unless it becomes unfeasible to monitor individual plants, then absolute percent canopy cover will be monitored alone. Based on the Water District's past experience in Reach 2, this transition is expected to occur in Year 3. In any event, survival will be monitored at least 1 year after irrigation of planted stock has been discontinued.

Wildlife monitoring is described under the long-term monitoring subsection.

Percent Canopy Cover. Canopy cover will be estimated using the line-intercept method (Bonham 1989) which will measure the vegetation cover along 100 meter long transects. The transects will be subsampled at regular intervals, and the number of transects will be a function of the amount of area covered by an individual site. Within revegetation sites, the number of transects ranges from a minimum of 2 to a maximum of 3 (see Table 17). Transects will be placed at each site so that the site is stratified in order to be able to measure the tall and medium canopy vegetation layers.

Measurements will begin at the transect origin (0 to 1 meters), and then will repeat at 2-meter intervals (i.e., 0-1 meters, 3-4 meters, 6-7 meters, 9-10 meters, etc.). For a 100-meter transect, this will result in 36 1-meter segments. The minimum sample size of 36 per transect is based on statistical formulas for nonnormally distributed data (Bonham 1989, equation 3.59, page 71). In order to provide the minimum sample size and have good stratification of the restoration site, a minimum of two 100-meter transects or 72 samples per site will be used (except for Site 9 which is a very small area). It is recommended that permanent stakes be placed at the points beginning each transect and a stake marking each beginning point of the 1-meter length.

The vegetation canopy cover will be measured in centimeters (cm) covered by an individual species within the 1-meter length. An example reading would be as follows: a 1-meter long segment of a transect could be covered by 60 cm of cottonwood, 50 cm of sycamore, 20 cm of oak, 20 cm of elderberry, and 10 cm of coyote brush.

Percent cover evaluation will be calculated by adding all the lengths in centimeters for every species measured, for all the transects within a site. The lengths will be converted to meters and divided by the total number of meters measured in a site.

An example of this type of reading is as follows: the total vegetation cover for each species on a site with 72 segments is: 34.6 meter cottonwood, 41.5 meter sycamore, 22.4 meter willow, 37.6 meter elderberry, and 14.8 meter coyote brush. Therefore, there is 48 percent cover of cottonwood, 58 percent cover of sycamore, 31 percent cover of willow, 52 percent cover of elderberry, and 21 percent cover of coyote brush.

Percent Survival. The sample size of trees and shrub species needed for monitoring of percent survival is dependent upon on the number of individuals planted per species per site. Thirty percent (30 percent) of plant species having 35 or more individuals per site will be monitored for survival. For plant species with fewer than 35 plants per site, a sample size of 10 plants of each species will be monitored. If the total number of all plants is less than 10, then all individuals will be monitored. Those plant species with more than 10 individuals and thus represented by a subsample of the population, will be randomly selected for monitoring.

Areas to be selected for monitoring will be identified on the detailed planting plan maps, to be developed once final construction plans are available. All the identified individuals in the area selected for monitoring will be given serial numbers on those maps. Random numbers will be selected proportionate to the sample size, as discussed above, by means of a random number table or a random number generating calculator. As an example, assume the planting plan for Site 3 shows that there will be a total of 44 sycamore trees, 15 live oak trees, and 15 valley oak trees, for a combined total of 74 trees. These trees will be mapped at the approximate locations on the final layout maps, and assigned serial numbers, such as 1 through 44 for sycamores. Following the sample size criteria discussed above, the sample size for sycamores would be 13 (or 30 percent of 44). The sample size for each oak species would be 10.

A list of 13 random numbers between 1 and 44 would be generated for the sycamores, and 10 random numbers between 1 and 15 would be generated for the oaks. These individuals would be marked on the planting plan map and tagged in the field with aluminum labels. These randomly selected trees would then be monitored for survivorship.

Each year the trees that are sampled would be assessed as to their survival status (alive or dead). Percent survivorship for each species at each site will then be calculated by dividing the number of plants counted as dead by the total number of plants sampled and multiplying by 100. This estimate of mortality can then be used in order to determine if success criteria have been met and if replanting is required.

For example, after 3 years, 2 of the originally marked 13 sycamore trees have died. Since the sample size represented 30 percent of the number of trees planted, then the assumption is that throughout the population of 44 trees, 6 trees have died.

3. *Rocked Streamside Habitat*

Percent canopy cover will be estimated using the line-intercept method described above in years 1 through 5.

4. *Herbaceous Cover Areas (Levee Slopes and Overflow Channel)*

No performance criteria and, therefore, no monitoring is proposed for the levee slopes and overflow channel.

5. *Monitoring of Groundwater Levels/Quality*

Groundwater monitoring wells have been installed at each planting site in Reach 3, and monitoring of groundwater depth is ongoing. Groundwater monitoring is to be conducted for a minimum of 4 years or until the end of the establishment period.

6. *Photodocumentation*

Permanent photographic points will be established within and overlooking the project area, to assist in evaluating overall community character. Panoramic photos will be taken twice annually at the same time each year, in spring and fall.

B. Long-Term Monitoring

Long-term monitoring of the revegetation sites will occur for the life of the project (100 years) in order to establish and document a general trend towards reaching a self-sustaining system. Long-term monitoring for vegetation will begin in year 10, repeat in year 15, and then every 10th year until year 100. Long-term monitoring for wildlife will be conducted at 5-year intervals for 15 years, and then every 10 years, for the duration of the project life (FEIS, 1987). Reports are to be submitted for agency review in December of each monitoring year.

Between years 5 through 9, and in subsequent years of no scheduled monitoring, annual site assessments will be conducted. During these annual site assessments, the general site condition will be recorded and the need for additional maintenance will be determined. If site conditions during a nondata collecting year appear to warrant investigation, an additional year of monitoring may be conducted. In year 8, a qualitative evaluation will be conducted to assess whether the sites are likely to meet the long-term success criteria.

1. *Vegetation Monitoring*

Long-term vegetation monitoring will consist of measuring percent canopy cover and will be conducted in the same manner as described for the short-term monitoring program above but on a less frequent basis.

2. *Wildlife Monitoring*

Wildlife monitoring will include sampling bird populations in comparably sized plots of existing riparian habitat. Two methods will be used: standardized observational techniques (point counts) will assess the more common and easily observed species, while capture/recapture program (standardized mist netting) will provide data on more secretive species. In addition, a breeding bird census and mammal, reptile and amphibian sampling will be conducted.

Point Counts. Permanent center point posts will be installed at least 100 meters apart within each revegetation site, with an equal number of posts established in adjacent riparian habitat. The census taker, beginning shortly after sunrise, will take a position adjacent to the marker post to begin an 8-minute period of observation. Pertinent information will be recorded including weather (e.g, temperature, wind and sky condition) and visibility limits. The census taker will then record, for each bird observed, its distance from the observer, its position in relation to the vegetation, and its activity. Care will be taken to avoid making additive any repeated observation of the same birds. Specific birds known to be present in more than one plot will be so recorded. Birds flying through or over the plot will be recorded along with notes on possible pertinence to that plot. At the end of the 8-minute period of observation, the observer will move to another circular plot center. To reduce bias, the order in which the points are censured will be randomized. A complete set us censuses will be made twice in each month of the year. Mammals, reptiles, and amphibians observed will also be recorded.

Mist Net Surveys. Twelve-meter long mist nets will be used to capture and band all captured birds. An equal number of mist nets will be placed at regular intervals perpendicular to the existing creek corridor in one revegetation site, with nets located in both the revegetation area and the existing creek corridor. Each net will be run from dawn to approximately 11 a.m., at least once each week throughout the monitoring year. Records will be kept of the hours each of the net lanes is open, and in which of the individually coded nets the birds, by species, are caught. Birds captured will be marked with serial numbered USFWS bands. Mensural data such as weight, wing length, stage in molt, sexual condition, body fat, skull pneumatization, and net lane of capture will be gathered. These same data will be collected upon recapture of already banded birds.

Breeding Bird Census. In each of the months from February to July, breeding bird censuses will be conducted in the streamside riparian strip and the revegetation plots.

Censuses will be made from dawn to 11 a.m. The numbers of territorial males, or breeding females (if males are not observed) of each species will be recorded. For each species with three or more territories detected within a habitat type, the number of breeding pairs per square kilometer will be calculated.

Mammal, Reptile, and Amphibian Sampling. Sherman live-traps will be set in 10-meter grids in both the riparian corridor and the revegetation plots. Sixty traps will be set on five successive nights in each. The habitats will be trapped quarterly. Small mammals (mostly rodents) captured will be ear-tagged, weighed, examined for reproductive condition and general health, and released. The vegetation at each trap site will be characterized using standard criteria such as relative and absolute cover of plant species. Larger mammals and their sign (e.g., tracks and scats) will be recorded whenever encountered.

To assess reptile and amphibian use of the study area, quadrants 50 meters square will be established and permanently marked in the riparian corridor and revegetation plots. Each quadrant will be systematically searched for amphibians and reptiles in each of March, April, May, and June. Included in the search pattern will be six 1-meter squares of plywood placed on the ground in each of the three quadrants to provide micro-climatically favorable cover for amphibians and reptiles. Each will have been in place several months prior to the first census in March and then left permanently in place for subsequent censuses. Each will be appropriately marked to prevent displacement. The censurer will spend 1 hour in each quadrant searching for amphibians and reptiles, including looking beneath each of the six shelters. Numbers and size classes of each species encountered will be recorded.

C. Reporting

The Water District Environmental staff will submit an annual monitoring report on the riparian mitigation program for review by USACE, USFWS, NMFS, and CDFG in December for years 1 through 5, and 8 and 10. Subsequent reports will be submitted in December of each future monitoring year. Information on survival, growth, and vigor of the planted woody species, condition of the herbaceous vegetation, replanting or reseeding needs, status of volunteer individuals, remedial actions taken over the past year, and any other relative data will be included. Analyses of any quantitative monitoring data will be provided, as well as relevant general comments or observations of a qualitative nature. Prints of the monitoring photographs will also be provided. Maps identifying monitoring areas, transects, and planting zones will be included as appropriate. Monthly rainfall at the Coyote Creek Riparian Station (Reach 2) and peak flows in the creek will be provided. The annual report will also list the preparers of the report as well as the monitors, and provide a copy of the Corps permit with any Special Conditions or Letters of Modification. The annual report for the riparian mitigation program will be combined with the annual fisheries reporting described in Section 3.

VII. COMPLETION OF MITIGATION

A. Notification of Completion

When the initial 5-year monitoring period is complete, and if applicant believes final success criteria have been met, applicant will so notify the Corps when submitting the 5-year report. The applicant will also notify the Corps at the end of the 10-year monitoring period regarding the success of fulfilling the 10-year success criteria.

B. Corps Confirmation

Following receipt of the report, the Corps may require a site visit to confirm the completion of the mitigation effort and any jurisdictional delineation.

VIII. CONTINGENCY MEASURES

A. Remedial Measures

Should the revegetation plan fail to meet the established success criteria in these areas, corrective measures will be undertaken. The precise corrective measures can only be established after the causes of mortality are determined or estimated. Contingency measures will generally consist of review of the monitoring reports for possible determination of the causes for mortality (for instance, broken or plugged irrigation lines, diseased stock, inferior stock, damage to the plant protection), study of possible contributing factors, adjustment of those factors as feasible, and replacement of the lost plantings. This is not an exhaustive analysis of the potential causes for failure, and site-specific analyses will be required if failure of the plantings is noted. A report discussing the additional studies conducted, the results of the analyses of contributing factors, and outlining remediation measures and proposed revegetation measures will be prepared and submitted to the Corps, USFWS, NMFS, and CDFG for approval prior to implementation of the proposed new plantings or remediation action.

B. Initiating Procedures (Criteria for Implementation)

If the mitigation fails to meet the success criteria after 5 years, but a significant portion of the mitigation plantings have been successful, then additional plantings may be all that is needed to bring the project in line with the success criteria. Failure to meet success criteria could be linked to easily identifiable and correctable factors such as breaks in the irrigation lines, vandalism, damage to predator protection screens, or possibly the origin or handling of the planting stock.

An analysis should be conducted of the reasons for plant mortality; depending on the pattern of the unsuccessful plantings (grouped versus scattered throughout), additional studies may be required, such as additional sampling of soils, depth to groundwater, or simply review of monitoring notes on origin and handling of the material may be sufficient to determine possible contributing factors. Additional plantings will be undertaken, and monitored as planned for the original plantings. Irrigation needs, nursery growing conditions, origin of the stock, handling methods, are all examples of elements that can affect survival of plantings that could be adjusted relatively easily for new replacement plantings.

Certain species may be more successful under the particular conditions of a site or a portion of the sites, and replacement plantings with a different species mix may be needed. A review of the survival/vigor of plantings by species may be all that is needed.

In more serious problem areas, additional testing of soils and groundwater may be needed. Soils structure, composition, nutrients, water retention capacity, and soil moisture regimes may be responsible for success or mortality of plantings. Trenching to observe soil profiles, depth, and structure may be called for. Pockets of different soil types may require variations in irrigation needs for establishment, or may support a different species mix within a larger area. Examples of problems not readily observed would be occurrence of a hard pan or clay layer at depth blocking penetration of roots, or pockets of alluvial cobbles that will not retain water for a long enough period once irrigation is halted. These can be dealt with in various ways, including soils amendments, creation of cracks or pits in the barrier layers, or more likely, adjustment of the species mix to more adequately reflect the micro-environment. Also, the potential for undiscovered groundwater or soils contamination may need to be verified, if other potential causes have been eliminated.

Depth to groundwater, and dramatic fluctuations in groundwater elevations, can also be an important factor in the survival of plantings. Comparison of areas where plantings are successful and areas where plantings have failed may reveal differences in topography that may be responsible for failure. The Reach 3 sites are at a higher elevation relative to the creek than Reach 2 plantings, and have a greater depth to groundwater than the pilot study area. The vegetation mix has been adjusted for this, but additional adjustments may be called for, depending on the results of the original plantings. Soils scientists and groundwater hydrologists should be consulted to assist in this evaluation. Monitoring wells may be required to determine the depth and fluctuations in groundwater at different locations, that can then be compared to planting success by species.

C. Alternate Locations

In extreme cases, new mitigation areas may need to be identified. This is a last resort measure that should only be used if other avenues prove unsuccessful. For instance, if depth to groundwater or seasonal fluctuations prove to be extreme, or soils contain impenetrable clay layers, and certain areas are judged to be unable to support a riparian woodland community even with adjustment of the species composition, then new locations within the Reach 3 corridor may be selected as providing a better micro-environment. Additional potential planting areas are limited within the lower reaches of Coyote Creek, and off-site mitigation should only be undertaken after serious study and if other corrective measures discussed above fail.

D. Funding

Any required contingency actions will be funded by the same mechanism used to fund the mitigation installation. This funding consists of existing revenues from property tax allocation and flood control benefit assessments, and debt financing by way of certificates of participation or other borrowing mechanisms.

E. Responsible Parties

The responsible party for contingency actions is Dr. Bernard Goldner, Environmental Section, Project Development Branch of the Santa Clara Valley Water District. This office is located at 5750 Almaden Expressway, San Jose, California 95118-3686. Dr. Goldner can be reached at: (408) 927-0710.

IX. REFERENCES AND PERSONAL COMMUNICATION

Bonham, C.D. 1989. Measurements for Terrestrial Vegetation. John Wiley & Sons, New York.

The Habitat Restoration Group. August 24, 1992. Coyote Creek Pilot Revegetation Project: Report on 3 Years of Monitoring (1987-1989) and Recommendations for Planning and Implementing Future Riparian Projects at Coyote Creek.

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U.S. Army Corps of Engineers, Sacramento District. May 1993. Final Environmental Assessment (FEA) for Proposed Refinements to the Coyote Creek Element of the Coyote and Berryessa Creeks Project. Corps, Sacramento, CA.

SECTION 3. FISHERIES MITIGATION AND MONITORING PROGRAM FOR COYOTE CREEK, REACH 3

I. INTRODUCTION

A. Fish Habitat

The fish habitat of lower Coyote Creek has been substantially degraded by past and present land use and watershed management activities in the Santa Clara Valley. At one time, the creek supported at least 16 native freshwater and anadromous fish species. The FR/EIS stated that probably only four native species remain; however, a subsequent fisheries evaluation study of lower Coyote Creek (HRG, 1989) showed that six native species are found in the creek: the California roach, hitch, Pacific lamprey, Sacramento blackfish, Sacramento sucker, and steelhead trout. The FR/EIS also reported the presence of the native prickly sculpin.

Since preparation of the FR/EIS, a Fisheries Evaluation Report was commissioned by the Water District to respond to agency concerns regarding potential impacts to fish and aquatic resources (HRG, 1989). These studies revealed evidence of steelhead and chinook salmon spawning and rearing activities in Coyote Creek. This new environmental information is summarized in the FEA.

B. Effects on Fish and Aquatic Resources

Construction of the flood control project will impact existing fisheries and aquatic resources. The degree of the adverse impacts will be directly proportional to the amount of riparian vegetation and channel substrate disturbance incurred throughout the project reach. Impacts to fisheries and aquatic resources identified during preparation of the FR/EIS, FEIS, and FEA are summarized below. After preparation of the FR/EIS, the Fisheries Evaluation Report commissioned by the Water District revealed the presence of steelhead and salmon spawning and rearing habitat in the reaches of Coyote Creek affected by the project. Mitigation for impacts to this newly discovered habitat have been developed in coordination with USFWS and CDFG. The impacts are outlined as follows:

- Loss of riparian vegetation could lead to increased water temperatures, affecting rearing habitat value.

- Loss of riparian habitat could also lead to loss of cover for juvenile fish in the crossover areas.

- The concrete-lined section under State Highway 237 could interfere with anadromous fish passage during high flows and would eliminate one of the rock riffle areas within the project.

- Construction would cause the loss of spawning riffles. Twenty potential spawning riffles, of which six have been observed to contain spawning redds, have been identified in Reach 3. Of these, only the riffles at Montague Expressway will be affected.

- Short-term impacts on spawning gravels from sediment deposition could occur during construction, and longer term discharge of sediments could occur from slope erosion at locations where vegetation breaks occur.

Measures to mitigate for fisheries and aquatic impacts as summarized include: provision of streambank shade and cover plantings in more open areas along the creek to provide shade, reduce water temperatures, and provide overhead cover; placement of additional baffles along the concrete inverts of the overflow channel to ease fish passage over the concrete-lined section under SR 237; replacement gravel for potential spawning riffles that will be impacted by the project; and confining the channel and utilizing boulder clusters in engineered sections of the stream.

A Storm Water Pollution Prevention Plan (SWPPP) and a Monitoring Program are required and will be in place for this project. The SWPPP identifies sources of sediment and details practices to be implemented to reduce sediments as well as pollutants that could result from the project. The contractor is required to submit an erosion control plan for approval prior to construction which meets the requirements of the SWPPP. Construction activities in the channel will be limited to the dry months, April 15 to October 15, and will only disturb native vegetation that is delineated to be cleared and replaced in the construction plans, and will minimize work that could disrupt the low-flow channel. Temporary barriers will be used to prevent erodible materials from entering the stream, and soil stabilization controls shall be implemented immediately on all graded slopes. As a result of these controls and the limited construction season, there are expected to be no increased sedimentation impacts to spawning gravels during or after construction.

Mitigation and monitoring plans for the above listed impacts are detailed in the following subsections of this plan. Table 16 summaries monitoring activities.

II. STREAMBANK SHADE AND COVER PLANTINGS

A. Goal

The goals of the revegetation effort along Lower Coyote Creek are to replace riparian habitat and seasonal wetland habitat lost due to flood facilities construction; provide cooling shade and hiding cover for fish species; and provide erosion control and weed control within the overflow channel and levee banks. The streambank shade and cover plantings are one element of this mitigation and monitoring plan for this project. Riparian vegetation controls a wide array of ecosystem functions related to streams, including shading and temperature control, cover for fish litter inputs, nutrient cycling, food web support, hydraulic roughness, bank stability, and infiltration and storage of flood flows.

B. Mitigation Plan

Approximately 1.5 acres of streambank shade and cover plantings are planned along Reach 3. Details regarding the species composition of this habitat type and implementation methodology are included in Section II Riparian Mitigation and Monitoring Program. Shade and cover planting areas will consist of localized plantings in streambank areas that are currently open or vegetated with low-growing non-native species such as periwinkle. The plantings will be concentrated primarily in a 15- to 25-foot wide band that is immediately adjacent to the stream, except in one area on the west bank near SR 237 that will be planted to the top of the bank. The streambank shade and cover planting locations will be along 2,510 lineal feet of streambank.

Streambank shade and cover plantings will occur within existing riparian habitats, where wildlife habitat and fish habitat are the major functions and values. About 40 percent of these areas (1,080 lineal feet) presently have vegetation which will be impacted by necessary project grading before being replanted. The remaining approximately 60 percent of the areas to be planted (1,430 lineal feet) are sparsely vegetated and their functions and values will be improved by the plantings.

The plantings will take 3 to 10 years to grow enough to provide shade and hiding cover to wildlife and fish habitats, and 15 to 20 years to provide shade and cover fully equivalent to what will be lost. Dominant plant species in this habitat will include cottonwood and willows, which are suitable for toe-of-slope and/or flood plain settings adjacent to the creek. These plant species are adapted to periodic flooding and scour, and would be able to grow close to the water table. Tree species in this habitat will provide reduce stream temperatures through shading of the creek and provide cover for fish from overhanging vegetation.

C. Monitoring and Reporting

Short-term and long-term monitoring, reporting, and contingency measures for streambank shade and cover plantings are described in detail in Section II Riparian Mitigation and Monitoring Program.

III. SPAWNING GRAVEL REPLACEMENT

A. Goal

The goal of the spawning gravel replacement element is to replace and enhance chinook salmon and steelhead trout spawning habitat in riffles in Reach 3. The intent is to replace the volume of gravels in the spawning riffle areas that will be affected by the rock lining construction immediately downstream from Montague Expressway on a 3:1 ratio.

B. Mitigation Plan

The Fisheries Evaluation Report (HRG, 1989) led to the discovery of evidence of salmon spawning sites (i.e., redds or nests) in the upper half of Reach 3. Adult chinook salmon have been observed in the creek within the city of San Jose in subsequent years (Dr. Jerry Smith, 1993, personal communication). While steelhead have been known to use Coyote Creek and its upstream tributaries as spawning and rearing habitat for many years, the fisheries evaluation study also determined that they utilize the lower creek reaches as rearing habitat and potentially for spawning as well.

The most critical habitat for steelhead and salmon spawning is the availability of spawning gravel (riffles). Natural gravel recruitment is probably very minimal in the lower reaches of Coyote Creek. Presently, Reach 3 is the only reach within lower Coyote Creek that provides spawning riffles. Seventeen potential spawning riffles were identified during sampling of the fisheries evaluation study. Fourteen of these potential spawning riffles occurred in the upper half of Reach 3.

The conversion of spawning riffle habitats immediately downstream from the Montague Expressway to rock-lined channel can be mitigated through the enhanced replacement of the riffle habitat (approximately 1,020 square feet—Dr. Smith, California State University-San Jose, personal communication). Full mitigation for lost spawning habitat at this site has been recommended at a spawning gravel volume replacement ratio of 3:1. The depths of spawning gravels on the impacted riffles have been described as shallow, generally ≤ 1 foot (Dr. Smith, personal communication). Given this gravel depth, and the assumed total habitat area involved, approximately 1,020 cubic feet of spawning gravels need to be replaced and enhanced at a 3:1 volume ratio, or about 3,060 cubic feet of gravel needs to be placed and maintained in adequate condition for use by spawning salmonids. The replacement gravel will be ½-inch to 2½-inch diameter rounded washed river gravel. Approximately 25 percent will be white gravel, mixed into serve as a tracer for future tracking of the fate of the replacement gravels. The gravel will be spread to depths of 1 to 2 feet, as appropriate to the characteristics of the sites receiving the gravel.

Two sites, one located at Station 685+50 and the other at Station 644+60, have previously been identified to receive the replacement gravel. They were selected because they have existing natural gravel riffles with appropriate natural hydraulic characteristics. However, the configuration of the stream channel and the location of gravel riffles have been observed to change. Therefore, the specific locations of gravel placement will be determined by the Water District or its fisheries consultant in consultation with CDFG in late summer or early fall following completion of the rock lining and other in-stream construction near Montague Expressway.

C. Monitoring and Reporting

Prior to September 1 of each year following initial gravel placement, qualified Water District staff, or the Water District's fisheries consultant, shall assess the volume and quality of the replacement gravels assumed to be in place the preceding winter. Primary physical measurements will be made of gravel embeddedness and gravel depth at the spawning riffle restoration and monitoring sites, to evaluate their quality. These measurements must be made after the winter flood season but before the onset of the fall and winter spawning season. Gravel embeddedness less than 15 percent and gravel depths ranging from 1 to 2 feet should provide suitable conditions for salmon and steelhead spawning. Streamflows that are regulated upstream from the project reaches will have a significant effect on water velocity and water depth and, thus, on the overall quality and usability of this habitat. If significant loss (35 percent of the volume of gravel present in the riffle(s) the prior years), siltation, or other deterioration is detected, remedial replacement and/or restoration measures will be implemented by September 30 with the concurrence of CDFG. The remedial actions may require new replacement of gravel to bring the volumes up to the initial target amounts(s) for the riffle(s), or locating different more appropriate sites under the circumstances to receive the new replacement gravel.

Spawning riffle utilization will be assessed during surveys directed at locating the presence of migrating adult salmon and steelhead. These surveys will be conducted monthly beginning in October and continuing through April to locate redds and observe spawning activity, unless there have been no storm events since the last inspection. Because of the annual rainfall variability in the region and the upstream water withdrawals, use of the stream for spawning and anadromous salmonids is likely to be highly variable. Salmon and steelhead could use the stream during years when adequate streamflows occur. Evaluation of anadromous salmonid use of restored habitat in lower Coyote Creek must account for this interannual variability. Therefore, these evaluations will have to be conducted for 10 years.

The spawning gravel quality (including remedial actions) and spawning riffle utilization assessments will be conducted annually for 10 years following initial project completion. The Water District will submit a report to CDFG, Corps, and other regulatory agencies at their request, on the assessments and any related remedial or other actions taken during the prior 12 months. Reporting on fisheries will be combined with the annual riparian mitigation report described in Section 2 of this report. At the end of 10 years or at any other time, with the concurrence of CDFG and Corps, the frequency of the annual assessments, actions, and reports can be reduced to once each 5 years or any other frequency considered appropriate.

IV. FISH PASSAGE AT SR 237

A. Goal

The goal of the fish passage modifications in the concrete-lined channel at the Highway 237 bridge crossing is to allow effective upstream and downstream migration of all life history stages of fish in Coyote Creek. Especially targeted is the spawning migrations of adult chinook salmon and steelhead trout which may try to pass upstream in the fall and winter months.

B. Mitigation Plan

The proposed concrete-lined channel under SR 237 is expected to pose passage problems for certain species of fish, especially adult salmon and steelhead. As a result the fish passage mitigation for this area was stipulated by the reviewing regulatory agencies to be the installation of Washington Baffles in the low-flow channel along the 690-foot length of the concrete channel lining. This baffle arrangement design has been used successfully since 1956 and meets state and federal criteria. It is the best known design for handling flows under the conditions that exist at the location. The design is shown in a typical plan drawing in Figure 2. The adequacy of this design was confirmed by comparing the expected hydraulic conditions at this site with specific fish passage criteria provided by the CDFG.

The annual 95 percentile (high flow passage criterion) and 50 percentile (low-flow passage criterion) flows were estimated from the design hydrograph for specific recurrence interval floods and from field measurements of low-flow velocities, as no daily streamflow information for lower Coyote Creek was available. At the projected annual 95 percentile flow, 60 cfs, a velocity of 3.2 to 3.8 feet per second, could be expected over the concrete invert. At the projected annual 50 percentile flow, 10 cfs, 3.5 to 4.0 feet per second is the expected velocity. These projected water velocities assume a channel slope ranging from ≤0.25 percent to about 0.50 percent. From these calculations, it was determined that the low-flow channel will provide adequate water depths (≤1 foot) and hydraulic conditions (resting pool intervals) for fish passage at the median annual or 50 percentile flow (approximate summer low flow). While the baffling in the low-flow channel will provide some degree of adequate fish passage conditions when inundated at higher flows (from the 50 to the 95 percentile flow level), it will also be necessary to provide baffling along the side slopes of the trapezoidal invert to ensure compliance with the requirement to fully provide for fish passage up to the annual 95 percentile flow. This will be accomplished by providing baffles 1 foot high by approximately 10 feet long along the trapezoidal sides of the concrete invert adjoining the angle with the bottom of the channel. With an expected water velocity at the 95 percentile flow of approximately 4 feet per second, baffles spaced at about 150-foot intervals along both sides of the invert will provide sufficient resting locations for steelhead and salmon (criteria provided by the CDFG's "Alaska Curve" relationship for water velocity and resting pool interval).

The low-flow channel of this concrete-lined section will be matched at its upstream and downstream ends to a smooth hydraulic transition with the low-flow channels provided in the grouted rock-lined stretches of stream to which it connects.

C. Monitoring and Reporting

The integrity of the fish passage facilities will be inspected by a qualified civil engineer prior to September 1 of each year following initial installation. Any remedial measures necessary to return the facilities to their original functional design capabilities will be completed by September 30.

Once each 2 weeks from October 1 through the following March 31, a visual inspection will be made of the entire concrete-lined section to ascertain that the facilities are free of debris, siltation, or other problems and that adult salmon and steelhead could effectively pass upstream. Any debris or other problems found will be corrected as soon as practicable. The biweekly frequency may be reduced if there have been no storm events since the last inspection, but in any event, should occur every October and at least once every 4 weeks through March.

Once each month from October through April, surveys of adult salmon and steelhead presence in Reach 3 of Coyote Creek will be made at the same times as the spawning riffle utilization surveys. Any observation of adult anadromous fish would indicate utilization of the fish passage facilities downstream. Because of the annual rainfall variability in the region and the upstream water withdrawals, use of the stream for spawning by anadromous salmonids is likely to be highly variable. Salmon and steelhead could use the stream during years when adequate streamflows occur. Evaluation of anadromous salmonid use of lower Coyote Creek must account for this interannual variability. Therefore, these evaluations will have to be conducted for several years.

The annual inspections by a qualified engineer, the biweekly inspections for debris in October through March, and any remedial measures necessary as a result of those inspections, will be conducted every year for the life of the project. The monthly salmon and steelhead utilization surveys will be conducted annually for at least 10 years following installation of the fish passage facilities. The Water District will submit a report to CDFG, Corps, and other regulatory agencies at their request, which reports on the physical inspections and any related remedial actions, and the findings of the utilization surveys. At the end of 10 years or at any other time, with the concurrence of CDFG and Corps, the frequency of the utilization surveys (and their concomitant reports) can be reduced to once each 5 years or any other frequency considered appropriate.

V. STREAM CHANNEL MODIFICATIONS

A. Goal

The goal of this mitigation element is to utilize reasonably practicable designs, under the constraints of maintaining the engineering integrity necessary to safely control flood flows, to provide fishery habitat value and structure in areas where the stream channel will be modified as part of the flood control project. This element is complementary to the streambank shade and cover plantings, the spawning gravel replacement, and the fish passage at SR 237.

B. Mitigation Plan

The values of each of the habitat types comprised by lower Coyote Creek differ in importance to, and utilization by, fishes inhabiting the creek. The relative qualitative values of each of the primary habitat types were discussed in the Fisheries Evaluation Report (HRG, 1989) which found that in Reach 3, 87 percent of the habitat was pool/run and only 13 percent was riffle, thereby resulting in a ranking of riffle habitat as being of greater importance in the reach. Also, riffle habitat was found to be the most utilized habitat by stream fishes, as well as some of it being available for spawning by chinook salmon and steelhead trout.

Rock lining of the stream channel bottom and riprap will be installed at the Montague Expressway crossing, the crossover area, and above and below the SR 237 crossing concrete-lined reach. The two 125-foot rock-lined reaches immediately above and below the concrete lining of SR 237 and the rock lining at Montague Expressway will be grouted. The crossover (approximately 350 linear feet) and the widening of the east bank near SR 237 (approximately 825 linear feet) will not be grouted. The crossover will provide additional rocky riffle stream bottom aquatic habitat value.

The above-referenced rock-lined reaches will have a low-flow channel designed to confine the flows of 10 cubic feet per second that occur the majority of the time. Such low-flow channel reaches will confine the water and aid in reducing water temperature increases through: (1) reducing surface area exposed to insolation; (2) reducing exposure to rock and other substrates which absorb heat and transfer it to the water flowing in contact with it; and (3) increasing average velocity through exposed areas.

In order to provide more structure and habitat value, clusters of three, approximately 2-foot diameter each, boulders will be placed in the low-flow channel of the crossover area. The boulder clusters will be placed in a semirandom pattern, averaging one cluster per 150 square feet of stream bottom channel area. The boulders will be drilled and cabled together to keep the clusters intact. Boulder clusters were originally planned for installation in the two 125-foot rock-lined reaches above and below the SR 237 crossing but cannot be effectively placed in those reaches due to flood flow hydraulics.

C. Monitoring and Reporting

Since the constituents (rock lining, riprap, construction of low-flow channels, installation of boulder clusters) of this mitigation element represent physical modifications put in place at the time of the Reach 3 flood control project construction, no specific long-term monitoring

See revisions under Corps permit (20178S12, Sep 6, 94) regarding any modifications a remedial — actions taken on these stream channel structures.

and reporting should be necessary as long as the engineered modifications stay in place. However, once each year, or as may be modified by CDFG and Corps, a subjective evaluation will be made of the status and physical integrity of these modifications relative to their design. A brief report summarizing the evaluation, and any actual or recommended remedial actions in the event inadequacies or problems are found, will be submitted to CDFG and Corps, and other regulatory agencies at their request.

VI. REFERENCES

Habitat Restoration Group (HRG). 1989. Lower Coyote Creek Fisheries Evaluation Report. Prepared for the Santa Clara Valley Water District, San Jose, CA. File No. 182-19. 49 p. + 4 appen.

TABLE 1
Plant Vigor Classifications

Vigor Class	Percent of Above Ground Growth Adversely Affected
Good *	< 75%
Poor	> 75%
Vigor classifications take into account the following criteria: disease symptoms, browsing, leaf color, and leaf size. A plant having less than 75% of its above ground growth affected with one or more of the above problems would be assigned a vigor rating of good, whereas a plant having more than 75% of its above ground growth affected would be assigned a vigor rating of poor.	

*Corps permit (Sept. 6, 1994, # 20178512) amends this table to change title of "Good" vigor class to "Adequate". Percentage does not change.

TABLE 2
Riparian Forest Mitigation and Setback Area Acreages

Site Name	Stations	Acres
Site 3	West Bank Station 597+00 to 608+00	1.1
Site 4	West Bank Station 610+00 to 618+00	1.5
Site 5	West Bank Station 621+00 to 629+00 West Bank Station 630+50 to 643+00	3.1
Site 6	East Bank Station 636+00 to 658+00	8.8
Site 7	East Bank Station 658+00 to 662+50	4.9
Site 8	West Bank Station 643+00 to 657+00	3.6
Site 9	West Bank Station 651+00 to 653+30	0.5
	TOTAL	23.5

TABLE 3
Plant Species Suitable for Planting in Revegetation Sites and Setback Areas

Scientific Name	Common Name
Tree Species	
Platanus racemosa	western sycamore
Populus Fremontii ssp. Fremontii	Fremont cottonwood
Populus balsamifera ssp. trichocarpa	black cottonwood
Quercus agrifolia	coast live oak
Quercus lobata	valley oak
Salix laevigata	red willow
Shrub and Vine Species	
Acer negundo var. californicum	box elder
Aesculus californica	buckeye
Artemisia calfornica	California sagebrush
Baccharis pilularis	coyote brush
Baccharis salicifolia	mule fat
Clematis ligustifolia	virgin's bower
Rosa californica	California rose
Rubus ursinus	California blackberry
Salix lasiolepis	arroyo willow
Sambucus mexicana	blue elderberry
Symphoricarpos albus var. laevigatus	snowberry
Herbaceous Species	
Apocynum cannabinum	Indian hemp
Artemisia douglasiana	mugwort
Aster chilensis	common aster
Baccharis douglasii	douglas' baccharis
Euthamia occidentalis	western goldenrod
Glycyrrhiza lepidota var. glutinosa	wild licorice
Leymus triticoides	creeping wild rye

TABLE 4
Plant Species Suitable for Planting in the Herbaceous Cover Areas

Scientific Name	Common Name	Planting Location
Achillea millefolium	yarrow	Levee/Overflow channel
Agropyron x Triticum	sterile wheat	Levee
Artemisia californica	California sagebrush	Levee
Artemisia douglasiana	mugwort	Overflow channel
Aster chilensis	common aster	Overflow channel
Atriplex semibaccata	Australian saltbush	Levee
Atriplex triangularis	spearscale	Overflow channel
Baccharis douglasii	Douglas' baccharis	Overflow channel
Distichlis spicata	saltgrass	Overflow channel
Eschscholzia californica	California poppy	Levee
Euthamia occidentalis	western goldenrod	Oveflow channel
Elymus glaucus	blue wildrye	Levee/Overflow channel
Festuca ovina ssp. duriuscula	hard fescue	Levee
Grindelia camporum	gumplant	Levee
Hemizonia pungens ssp. maritima	common spikeweed	Levee
Hordeum brachyantherum	meadow barley	Overflow channel
Hordeum brachyantherum ssp californicum	meadow barley	Levee
Leymus triticoides	creeping wildrye	Overflow channel
Lotus purshianus var. purshianus	Spanish clover	Levee
Lotus scoparius	deerweed	Levee
Lupinus succulentus	arroyo lupine	Levee/Oveflow channel
Malvella leprosa	alkali-mallow	Overflow channel
Medicago (cultivars)	sweetclover	Levee
Melica imperfecta	melic grass	Levee/Overflow channel
Nasella (Stipa) pulchra	purple needle grass	Levee
Spergularia marina	sand-spurry	Overflow channel
Trifolium gracilentum var. gracilentum	annual clover	Levee
Trifolium subterraneum (cultivar)	subterranean clover	Levee
Trifolium willdenovii	Tomcat clover	Levee
Vulpia myuros	'Zorro' fescue	Levee

Note: synonomy is consistent with Hickman, 1993 (with the exception of some cultivars).

TABLE 5
Plant Species Suitable for Planting in the Rocked Streamside Areas

Scientific Name	Common Name
Artemisia douglasiana	mugwort
Baccharis douglasii	Douglas' baccharis
Euthamia occidentalis	western goldenrod
Helenium puberulem	sneezeweed
Leymus triticoides	creeping wildrye
Rubus ursinus	California blackberry
Note: plant taxonomy and common names are per Hickman, 1993.	

Table 6. Revegetation Planting Plan for Site 3 (1.1 acres)

R-1

	Trees in Cottonwood Association (per acre)	Trees in Sycamore/Oak Plant Association (per acre)	Plants in Willow Scrub Plant Association (per acre)	Plants in Boxelder/Elderberry Plant Association (per acre)	Plants in Blackberry/Rose Plant Association (per acre)	Plants in Coyote Brush Scrub Plant Association (per acre)	Plants in Herbaceous Plant Association (per acre)	Total Number of Plants by Species (per acre)	Total Number of Plants by Species (per site)	% by bas
Tree Species (Upper Canopy)										
Platanus racemosa	17	44	0	0	0	0	0	61	67	51.
Populus fremontii ssp. fremontii	82	0	0	0	0	0	0	82	90	6
Populus balsamifera ssp. trichocarpa	3	0	0	0	0	0	0	3	4	0.3
Quercus agrifolia	0	15	0	0	0	0	0	15	16	1
Quercus lobata	17	15	0	0	0	0	0	32	35	3
Salix laevigata	51	0	0	0	0	0	0	51	56	4
Shrub and Vine Species (Middle Canopy)										
Acer negundo var. californicum	0	0	0	101	0	0	0	101	111	8
Aesculus californica	0	0	0	50	0	0	0	50	55	4
Artemisia californica	0	0	0	0	0	10	0	10	11	0.
Baccharis pilularis	0	0	0	0	0	10	0	10	11	0.
Baccharis salicifolia	0	0	0	0	0	0	0	0	0	0
Clematis ligustifolia *	0	0	0	0	113	0	0	113	124	3
Rosa californica *	0	0	0	0	113	0	0	113	124	3
Rubus ursinus [R. vitifolius] *	0	0	0	0	113	0	0	113	124	3
Salix lasiolepis	0	0	0	0	0	0	0	0	0	0
Sambucus mexicana	0	0	0	101	0	0	0	101	111	8
Symphoricarpos albus var. laevigatus *	0	0	0	0	113	0	0	113	124	3
Herbaceus species (Low Canopy)										
Apocynum cannabinum *	0	0	0	0	0	0	28	28	31	0.7
Artemisia douglasiana *	0	0	0	0	0	0	70	70	77	2
Aster chilensis *	0	0	0	0	0	0	28	28	31	0.7
Baccharis douglasii *	0	0	0	0	0	0	42	42	46	1
Glycyrrhiza lepidota *	0	0	0	0	0	19	0	19	20	0.5
Leymus triticoides *	0	0	0	0	0	0	56	56	61	1.5
Euthamia occidentalis *	0	0	0	0	0	0	56	56	61	1.5
* Species planted 3 per basin										
Total Plants by Plant Association (per acre)	171	73	0	252	453	39	279	1267	1393	
Planting Basins by Plant Association (per acre)	171	73	0	252	151	26	93			
Number of Plants in Site by Plant Association	188	81	0	277	498	43	307			
Total Planting Basins (per acre)	766									
Total Plants (per acre)	1267									
Total Number of Plants to be Installed in Site	1393									
Canopy as a Proportion of Total Planting Basins and Plants (per acre)										
	Planting Basins	**Total Plants**								
Upper Canopy	32%	19%								
Middle Canopy	55%	57%								
Low Canopy	13%	24%								
Calculations are based on the following triangular densities: Trees at 12 feet on center at 349 basins per acre; Shrubs at 10 feet on center at 503 basins per acre; Herbs at 9 feet on center at 621 basins per acre.										
Note: all calculations have been rounded to whole numbers.										

Table 7. Revegetation Plantin .n for Site 4 (1.5 acres)

R-2

	Trees in Cottonwood Association (per acre)	Trees in Sycamore/Oak Plant Association (per acre)	Plants in Willow Scrub Plant Association (per acre)	Plants in Boxelder/Elderberry Plant Association (per acre)	Plants in Blackberry/Rose Plant Association (per acre)	Plants in Coyote Brush Scrub Plant Association (per acre)	Plants in Herbaceous Plant Association (per acre)	Total Number of Plants by Species (per acre)	Total Number of Plants by Species (per site)	
Tree Species (Upper Canopy)										
Platanus racemosa	6	37	0	0	0	0	0	43	64	3
Populus fremontii ssp. fremontii	29	0	0	0	0	0	0	29	44	2
Populus balsamifera ssp. trichocarpa	1	0	0	0	0	0	0	1	2	
Quercus agrifolia	0	12	0	0	0	0	0	12	18	1
Quercus lobata	6	12	0	0	0	0	0	18	27	1
Salix laevigata	18	0	10	0	0	0	0	29	43	2
Shrub and Vine Species (Middle Canopy)										
Acer negundo var. californicum	0	0	0	136	0	0	0	136	204	9
Aesculus californica	0	0	0	68	0	0	0	68	102	4
Artemisia californica	0	0	0	0	0	28	0	28	42	2
Baccharis pilularis	0	0	0	0	0	28	0	28	42	2
Baccharis salicifolia	0	0	8	0	0	0	0	8	11	0.5
Clematis ligustifolia *	0	0	0	0	106	0	0	106	158	2
Rosa californica *	0	0	0	0	106	0	0	106	158	2
Rubus ursinus [R. vitifolius] *	0	0	0	0	106	0	0	106	158	2
Salix lasiolepis	0	0	15	0	0	0	0	15	23	1
Sambucus mexicana	0	0	0	136	0	0	0	136	204	9
Symphoricarpos albus var. laevigatus *	0	0	0	0	106	0	0	106	158	2
Herbaceus species (Low Canopy)										
Apocynum cannabinum *	0	0	0	0	0	0	52	52	78	1
Artemisia douglasiana *	0	0	0	0	0	0	130	130	196	3
Aster chilensis *	0	0	0	0	0	0	52	52	78	1
Baccharis douglasii *	0	0	0	0	0	0	78	78	117	2
Glycyrrhiza lepidota *	0	0	0	0	0	52	0	52	78	1
Leymus triticoides *	0	0	0	0	0	0	104	104	156	2
Euthamia occidentalis *	0	0	0	0	0	0	104	104	156	2
* Species planted 3 per basin										
Total Plants by Plant Association (per acre)	61	61	33	340	423	109	522	1547	2321	
Planting Basins by Plant Association (per acre)	61	61	33	340	141	74	174			
Number of Plants in Site by Plant Association	92	92	50	509	634	163	782			
Total Planting Basins (per acre)	883									
Total Plants (per acre)	1547									
Total Number of Plants to be Installed in Site	2321									
Canopy as a Proportion of Total Planting Basins and Plants (per acre)										
	Planting Basins	**Total Plants**								
Upper Canopy	15%	9%								
Middle Canopy	63%	54%								
Low Canopy	22%	37%								
Calculations are based on the following triangular densities: Trees at 12 feet on center at 349 basins per acre; Shrubs at 10 feet on center at 503 basins per acre; Herbs at 9 feet on center at 621 basins per acre.										
Note: all calculations have been rounded to whole numbers.										

Table 8. Revegetation Planting Plan for Site 5 (3.1 acres) R-3

	Trees in Cottonwood Association (per site)	Trees in Sycamore/Oak Plant Association (per site)	Plants in Willow Scrub Plant Association (per site)	Trees in Boxelder/Elderberry Plant Association (per site)	Plants in Blackberry/Rose Plant Association (per site)	Plants in Coyote Brush Scrub Plant Association (per site)	Plants in Herbaceous Plant Association (per site)	Total Number of Plants by Species (per acre)	Total Number of Plants by Species (per site)
Tree Species (Upper Canopy)									
Platanus racemosa	11	52	0	0	0	0	0	62	193
Populus fremontii ssp. fremontii	51	0	0	0	0	0	0	51	157
Populus balsamifera ssp. trichocarpa	2	0	0	0	0	0	0	2	7
Quercus agrifolia	0	17	0	0	0	0	0	17	54
Quercus lobata	11	17	0	0	0	0	0	28	86
Salix laevigata	32	0	24	0	0	0	0	56	174
Shrub and Vine Species (Middle Canopy)									
Acer negundo var. californicum	0	0	0	106	0	0	0	106	327
Aesculus californica	0	0	0	53	0	0	0	53	164
Artemisia californica	0	0	0	0	0	28	0	28	87
Baccharis pilularis	0	0	0	0	0	28	0	28	87
Baccharis salicifolia	0	0	18	0	0	0	0	18	55
Clematis ligustifolia *	0	0	0	0	132	0	0	132	409
Rosa californica *	0	0	0	0	132	0	0	132	409
Rubus ursinus [R. vitifolius] *	0	0	0	0	132	0	0	132	409
Salix lasiolepis	0	0	35	0	0	0	0	35	109
Sambucus mexicana	0	0	0	106	0	0	0	106	327
Symphoricarpos albus var. laevigatus *	0	0	0	0	132	0	0	132	409
Herbaceus species (Low Canopy)									
Apocynum cannabinum *	0	0	0	0	0	0	39	39	121
Artemisia douglasiana *	0	0	0	0	0	0	98	98	303
Aster chilensis *	0	0	0	0	0	0	39	39	121
Baccharis douglasii *	0	0	0	0	0	0	59	59	182
Glycyrrhiza lepidota *	0	0	0	0	0	52	0	52	162
Leymus triticoides *	0	0	0	0	0	0	78	78	243
Euthamia occidentalis *	0	0	0	0	0	0	78	78	243
* Species planted 3 per basin									
Total Plants by Plant Association (per acre)	106	86	77	264	528	109	391	1561	4840
Planting Basins by Plant Association (per acre)	106	86	77	264	176	74	130		
Number of Plants in Site by Plant Association	327	268	239	819	1637	336	1213		
Total Planting Basins (per acre)	913								
Total Plants (per acre)	1561								
Total Number of Plants to be Installed in Site	4840								
Canopy as a Proportion of Total Planting Basins and Plants (per acre)									
	Planting Basins	**Total Plants**							
Upper Canopy	24%	14%							
Middle Canopy	60%	58%							
Low Canopy	16%	28%							
Calculations are based on the following triangular densities: Trees at 12 feet on center at 349 basins per acre; Shrubs at 10 feet on center at 503 basins per acre; Herbs at 9 feet on center at 621 basins per acre.									
Note: all calculations have been rounded to whole numbers.									

Table 9. Revegetation Planting .n for Site 6 (8.8 acres)

R-4

	Trees in Cottonwood Association (per acre)	Trees in Sycamore/Oak Plant Association (per acre)	Plants in Willow Scrub Plant Association (per acre)	Plants in Boxelder/Elderberry Plant Association (per acre)	Plants in Blackberry/Rose Plant Association (per acre)	Plants in Coyote Brush Scrub Plant Association (per acre)	Plants in Herbaceous Plant Association (per acre)	Total Number of Plants by Species (per acre)	Total Number of Plants by Species (per site)
Tree Species (Upper Canopy)									
Platanus racemosa	10	88	0	0	0	0	0	98	860
Populus fremontii ssp. fremontii	47	0	0	0	0	0	0	47	413
Populus balsamifera ssp. trichocarpa	2	0	0	0	0	0	0	2	17
Quercus agrifolia	0	29	0	0	0	0	0	29	258
Quercus lobata	10	29	0	0	0	0	0	39	344
Salix laevigata	29	0	14	0	0	0	0	43	381
Shrub and Vine Species (Middle Canopy)									
Acer negundo var. californicum	0	0	0	80	0	0	0	80	708
Aesculus californica	0	0	0	40	0	0	0	40	354
Artemisia californica	0	0	0	0	0	11	0	11	97
Baccharis pilularis	0	0	0	0	0	11	0	11	97
Baccharis salicifolia	0	0	10	0	0	0	0	10	89
Clematis ligustifolia *	0	0	0	0	62	0	0	62	548
Rosa californica *	0	0	0	0	62	0	0	62	548
Rubus ursinus [R. vitifolius] *	0	0	0	0	62	0	0	62	548
Salix lasiolepis	0	0	20	0	0	0	0	20	177
Sambucus mexicana	0	0	0	80	0	0	0	80	708
Symphoricarpos albus var. laevigatus *	0	0	0	0	62	0	0	62	548
Herbaceus species (Low Canopy)									
Apocynum cannabinum *	0	0	0	0	0	0	61	61	541
Artemisia douglasiana *	0	0	0	0	0	0	154	154	1353
Aster chilensis *	0	0	0	0	0	0	61	61	541
Baccharis douglasii *	0	0	0	0	0	0	92	92	812
Glycyrrhiza lepidota *	0	0	0	0	0	20	0	20	180
Leymus triticoides *	0	0	0	0	0	0	123	123	1082
Euthamia occidentalis *	0	0	0	0	0	0	123	123	1082
* Species planted 3 per basin									
Total Plants by Plant Association (per acre)	**98**	**147**	**44**	**201**	**249**	**43**	**615**	1396	12285
Planting Basins by Plant Association (per acre)	**98**	**147**	**44**	**201**	**83**	**29**	**205**		
Number of Plants in Site by Plant Association	**860**	**1290**	**388**	**1771**	**2191**	**375**	**5410**		
Total Planting Basins (per acre)	**807**								
Total Plants (per acre)	**1396**								
Total Number of Plants to be Installed in Site	**12285**								
Canopy as a Proportion of Total Planting Basins and Plants (per acre)									
	Planting Basins	**Total Plants**							
Upper Canopy	**32%**	**18%**							
Middle Canopy	**42%**	**36%**							
Low Canopy	**26%**	**46%**							
Calculations are based on the following triangular densities: Trees at 12 feet on center at 349 basins per acre; Shrubs at 10 feet on center at 503 basins per acre; Herbs at 9 feet on center at 621 basins per acre.									
Note: all calculations have been rounded to whole numbers.									

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Table 10. Revegetation Planting Plan for Site 7 (4.9 acres)

V - 5

	Trees in Cottonwood Association (per acre)	Trees in Sycamore/Oak Plant Association (per acre)	Plants in Willow Scrub Plant Association (per acre)	Plants in Boxelder/Elderberry Plant Association (per acre)	Plants in Blackberry/Rose Plant Association (per acre)	Plants in Coyote Brush Scrub Plant Association (per acre)	Plants in Herbaceous Plant Association (per acre)	Total Number of Plants by Species (per acre)	Total Number of Plants by Species (per site)
Tree Species (Upper Canopy)									
Platanus racemosa	7	42	0	0	0	0	0	49	239
Populus fremontii ssp. fremontii	34	0	0	0	0	0	0	34	164
Populus balsamifera ssp. trichocarpa	1	0	0	0	0	0	0	1	7
Quercus agrifolia	0	14	0	0	0	0	0	14	68
Quercus lobata	7	14	0	0	0	0	0	21	103
Salix laevigata	21	0	25	0	0	0	0	46	226
Shrub and Vine Species (Middle Canopy)									
Acer negundo var. californicum	0	0	0	145	0	0	0	145	710
Aesculus californica	0	0	0	72	0	0	0	72	355
Artemisia californica	0	0	0	0	0	26	0	26	128
Baccharis pilularis	0	0	0	0	0	26	0	26	128
Baccharis salicifolia	0	0	18	0	0	0	0	18	89
Clematis ligustifolia *	0	0	0	0	98	0	0	98	481
Rosa californica *	0	0	0	0	98	0	0	98	481
Rubus ursinus [R. vitifolius] *	0	0	0	0	98	0	0	98	481
Salix lasiolepis	0	0	36	0	0	0	0	36	177
Sambucus mexicana	0	0	0	145	0	0	0	145	710
Symphoricarpos albus var. laevigatus *	0	0	0	0	98	0	0	98	481
Herbaceus species (Low Canopy)									
Apocynum cannabinum *	0	0	0	0	0	0	48	48	237
Artemisia douglasiana *	0	0	0	0	0	0	121	121	593
Aster chilensis *	0	0	0	0	0	0	48	48	237
Baccharis douglasii *	0	0	0	0	0	0	73	73	356
Glycyrrhiza lepidota *	0	0	0	0	0	48	0	48	237
Leymus triticoides *	0	0	0	0	0	0	97	97	475
Euthamia occidentalis *	0	0	0	0	0	0	97	97	475
* Species planted 3 per basin									
Total Plants by Plant Association (per acre)	**70**	**70**	**79**	**362**	**392**	**101**	**484**	1559	7638
Planting Basins by Plant Association (per acre)	**70**	**70**	**79**	**362**	**131**	**68**	**161**		
Number of Plants in Site by Plant Association	**342**	**342**	**389**	**1775**	**1922**	**494**	**2373**		
Total Planting Basins (per acre)	**942**								
Total Plants (per acre)	**1559**								
Total Number of Plants to be Installed in Site	**7638**								
Canopy as a Proportion of Total Planting Basins and Plants (per acre)									
	Planting Basins	**Total Plants**							
Upper Canopy	**17%**	**11%**							
Middle Canopy	**64%**	**55%**							
Low Canopy	**19%**	**34%**							
Calculations are based on the following triangular densities: Trees at 12 feet on center at 349 basins per acre; Shrubs at 10 feet on center at 503 basins per acre; Herbs at 9 feet on center at 621 basins per acre.									
Note: all calculations have been rounded to whole numbers.									

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Table 11. Revegetation Planting Plan for Site 8 (3.6 acres)

	Trees in Cottonwood Association (per acre)	Trees in Sycamore/Oak Plant Association (per acre)	Plants in Willow Scrub Plant Association (per acre)	Plants in Boxelder/Elderberry Plant Association (per acre)	Plants in Blackberry/Rose Plant Association (per acre)	Plants in Coyote Brush Scrub Plant Association (per acre)	Plants in Herbaceous Plant Association (per acre)	Total Number of Plants by Species (per acre)	Total Number of Plants by Species (per site)
Tree Species (Upper Canopy)									
Platanus racemosa	14	84	0	0	0	0	0	98	371
Populus fremontii ssp. fremontii	67	0	0	0	0	0	0	67	255
Populus balsamifera ssp. trichocarpa	3	0	0	0	0	0	0	3	11
Quercus agrifolia	0	28	0	0	0	0	0	28	106
Quercus lobata	14	28	0	0	0	0	0	42	159
Salix laevigata	42	0	8	0	0	0	0	50	191
Shrub and Vine Species (Middle Canopy)									
Acer negundo var. californicum	0	0	0	48	0	0	0	48	183
Aesculus californica	0	0	0	24	0	0	0	24	92
Artemisia californica	0	0	0	0	0	11	0	11	42
Baccharis pilularis	0	0	0	0	0	11	0	11	42
Baccharis salicifolia	0	0	6	0	0	0	0	6	23
Clematis ligustifolia *	0	0	0	0	104	0	0	104	394
Rosa californica *	0	0	0	0	104	0	0	104	394
Rubus ursinus [R. vitifolius] *	0	0	0	0	104	0	0	104	394
Salix lasiolepis	0	0	12	0	0	0	0	12	46
Sambucus mexicana	0	0	0	48	0	0	0	48	183
Symphoricarpos albus var. laevigatus *	0	0	0	0	104	0	0	104	394
Herbaceus species (Low Canopy)									
Apocynum cannabinum *	0	0	0	0	0	0	41	41	156
Artemisia douglasiana *	0	0	0	0	0	0	102	102	389
Aster chilensis *	0	0	0	0	0	0	41	41	156
Baccharis douglasii *	0	0	0	0	0	0	61	61	234
Glycyrrhiza lepidota *	0	0	0	0	0	20	0	20	78
Leymus triticoides *	0	0	0	0	0	0	82	82	311
Euthamia occidentalis *	0	0	0	0	0	0	82	82	311
* Species planted 3 per basin									
Total Plants by Plant Association (per acre)	**140**	**140**	**26**	**121**	**415**	**43**	**410**	1294	4917
Planting Basins by Plant Association (per acre)	**140**	**140**	**26**	**121**	**138**	**29**	**137**		
Number of Plants in Site by Plant Association	**530**	**530**	**101**	**459**	**1577**	**162**	**1557**		
Total Planting Basins (per acre)	**730**								
Total Plants (per acre)	**1294**								
Total Number of Plants to be Installed in Site	**4917**								
Canopy as a Proportion of Total Planting Basins and Plants (per acre)									
	Planting Basins	**Total Plants**							
Upper Canopy	**39%**	**22%**							
Middle Canopy	**41%**	**45%**							
Low Canopy	**20%**	**33%**							
Calculations are based on the following triangular densities: Trees at 12 feet on center at 349 basins per acre; Shrubs at 10 feet on center at 503 basins per acre; Herbs at 9 feet on center at 621 basins per acre.									
Note: all calculations have been rounded to whole numbers.									

3sit8plt.xls

Table 12. Revegetation Planting Plan for Site 9 (0.5 acres)

	Trees in Cottonwood Association (per acre)	Trees in Sycamore/Oak Plant Association (per acre)	Plants in Willow Scrub Plant Association (per acre)	Plants in Boxelder/Elderberry Plant Association (per acre)	Plants in Blackberry/Rose Plant Association (per acre)	Plants in Coyote Brush Scrub Plant Association (per acre)	Plants in Herbaceous Plant Association (per acre)	Total Number of Plants by Species (per acre)	Total Number of Plants by Species (per site)
Tree Species (Upper Canopy)									
Platanus racemosa	12	73	0	0	0	0	0	86	43
Populus fremontii ssp. fremontii	59	0	0	0	0	0	0	59	29
Populus balsamifera ssp. trichocarpa	2	0	0	0	0	0	0	2	1
Quercus agrifolia	0	24	0	0	0	0	0	24	12
Quercus lobata	12	24	0	0	0	0	0	37	18
Salix laevigata	37	0	17	0	0	0	0	53	27
Shrub and Vine Species (Middle Canopy)									
Acer negundo var. californicum	0	0	0	36	0	0	0	36	18
Aesculus californica	0	0	0	18	0	0	0	18	9
Artemisia californica	0	0	0	0	0	0	0	0	0
Baccharis pilularis	0	0	0	0	0	0	0	0	0
Baccharis salicifolia	0	0	12	0	0	0	0	12	6
Clematis ligustifolia *	0	0	0	0	132	0	0	132	66
Rosa californica *	0	0	0	0	132	0	0	132	66
Rubus ursinus [R. vitifolius] *	0	0	0	0	132	0	0	132	66
Salix lasiolepis	0	0	24	0	0	0	0	24	12
Sambucus mexicana	0	0	0	36	0	0	0	36	18
Symphoricarpos albus var. laevigatus *	0	0	0	0	132	0	0	132	66
Herbaceus species (Low Canopy)									
Apocynum cannabinum *	0	0	0	0	0	0	65	65	33
Artemisia douglasiana *	0	0	0	0	0	0	163	163	82
Aster chilensis *	0	0	0	0	0	0	65	65	33
Baccharis douglasii *	0	0	0	0	0	0	98	98	49
Glycyrrhiza lepidota *	0	0	0	0	0	0	0	0	0
Leymus triticoides *	0	0	0	0	0	0	130	130	65
Euthamia occidentalis *	0	0	0	0	0	0	130	130	65
* Species planted 3 per basin									
Total Plants by Plant Association (per acre)	122	122	53	91	528	0	652	1568	784
Planting Basins by Plant Association (per acre)	122	122	53	91	176	0	217		
Number of Plants in Site by Plant Association	61	61	26	45	264	0	326		
Total Planting Basins (per acre)	781								
Total Plants (per acre)	1568								
Total Number of Plants to be Installed in Site	784								
Canopy as a Proportion of Total Planting Basins and Plants (per acre)									
	Planting Basins	**Total Plants**							
Upper Canopy	33%	17%							
Middle Canopy	39%	42%							
Low Canopy	28%	42%							
Calculations are based on the following triangular densities: Trees at 12 feet on center at 349 basins per acre; Shrubs at 10 feet on center at 503 basins per acre; Herbs at 9 feet on center at 621 basins per acre.									
Note: all calculations have been rounded to whole numbers.									

Table 13. Revegetation Planting Pl. or Setback Area (2.0 acres) R-6 0 7 ac

	Trees in Cottonwood Association (per acre)	Trees in Sycamore/Oak Plant Association (per acre)	Plants in Willow Scrub Plant Association (per acre)	Plants in Boxelder/Elderberry Plant Association (per acre)	Plants in Blackberry/Rose Plant Association (per acre)	Plants in Coyote Brush Scrub Plant Association (per acre)	Plants in Herbaceous Plant Association (per acre)	Total Number of Plants by Species (per acre)	Total Number of Plants by Species (per site)
Tree Species (Upper Canopy)									
Platanus racemosa	12	73	0	0	0	0	0	86	171
Populus fremontii ssp. fremontii	59	0	0	0	0	0	0	59	117
Populus balsamifera ssp. trichocarpa	2	0	0	0	0	0	0	2	5
Quercus agrifolia	0	24	0	0	0	0	0	24	49
Quercus lobata	12	24	0	0	0	0	0	37	73
Salix laevigata	37	0	0	0	0	0	0	37	73
Shrub and Vine Species (Middle Canopy)									
Acer negundo var. californicum	0	0	0	80	0	0	0	80	161
Aesculus californica	0	0	0	40	0	0	0	40	80
Artemisia californica	0	0	0	0	0	11	0	11	22
Baccharis pilularis	0	0	0	0	0	11	0	11	22
Baccharis salicifolia	0	0	0	0	0	0	0	0	0
Clematis ligustifolia *	0	0	0	0	104	0	0	104	207
Rosa californica *	0	0	0	0	104	0	0	104	207
Rubus ursinus [R. vitifolius] *	0	0	0	0	104	0	0	104	207
Salix lasiolepis	0	0	0	0	0	0	0	0	0
Sambucus mexicana	0	0	0	80	0	0	0	80	161
Symphoricarpos albus var. laevigatus *	0	0	0	0	104	0	0	104	207
Herbaceus species (Low Canopy)									
Apocynum cannabinum *	0	0	0	0	0	0	41	41	82
Artemisia douglasiana *	0	0	0	0	0	0	102	102	205
Aster chilensis *	0	0	0	0	0	0	41	41	82
Baccharis douglasii *	0	0	0	0	0	0	61	61	123
Glycyrrhiza lepidota *	0	0	0	0	0	20	0	20	41
Leymus triticoides *	0	0	0	0	0	0	82	82	164
Euthamia occidentalis *	0	0	0	0	0	0	82	82	164
* Species planted 3 per basin									
Total Plants by Plant Association (per acre)	122	122	0	201	415	43	410	1313	2626
Planting Basins by Plant Association (per acre)	122	122	0	201	138	29	137		
Number of Plants in Site by Plant Association	244	244	0	402	830	85	820		
Total Planting Basins (per acre)	749								
Total Plants (per acre)	1313								
Total Number of Plants to be Installed in Site	2626								
Canopy as a Proportion of Total Planting Basins and Plants (per acre)									
	Planting Basins	**Total Plants**							
Upper Canopy	33%	19%							
Middle Canopy	48%	49%							
Low Canopy	19%	33%							
Calculations are based on the following triangular densities: Trees at 12 feet on center at 349 basins per acre; Shrubs at 10 feet on center at 503 basins per acre; Herbs at 9 feet on center at 621 basins per acre.									
Note: all calculations have been rounded to whole numbers.									

3Setplt.xls

TABLE 14
List of Propagule or Nursery Stock to be Planted in Reach 3

Scientific Name	Propagule Type and Nursery Stock Size	Collection Time	Collection Time Prior to Planting (Years)
Trees			
Acer negundo var. californicum *	Tree pot	Fall	1
Aesculus californica	Tree pot or direct seed	Fall	1
Platanus racemosa *	Tree pot	Late fall	1
Populus Fremontii ssp. Fremontii *	Tree pot from cutting	Dec-Jan or Apr	1-0.5
Populus balsamifera ssp. trichocarpa *	Tree pot from cutting	Dec-Jan or Apr	1-0.5
Quercus agrifolia *	Tree pot or direct seed	Fall	1
Quercus lobata *	Tree pot or direct seed	Fall	1
Salix laevigata *	Tree pot or short cutting	Dec-Jan or Apr	1-0.5
Shrubs/Vines			
Artemisia californica	Dee pot from seed or cutting	Late fall	1
Baccharis pilularis	Dee pot from seed or cutting	Fall	1
Baccharis salicifolia *(B. viminea)*	Tree pot from seed or cutting	Spring	1
Clematis ligusticifolia	Dee pot from seed	Fall	1
*Rosa californica**	Dee pot from seed or cutting	Fall/winter	0.5
Rubus ursinus (R. vitifolius)	Dee pot from cutting	Spring	0.5
Salix lasiolepis *	Tree pot or Short cutting	Dec-Jan or Apr	1-0.5
*Sambucus mexicana**	Tree pot from seed	Summer/ Fall	1.5-1
Symphoricarpos albus var. laevigatus (S. rivularis)	One gallon pot from seed or cutting	Winter/ spring	1
Herbaceous Species			
Apocynum cannabinum	One gallon pot from seed, root cutting, or rhizomes	Fall/Winter	1-2
Artemisia douglasiana	One gallon pot from seed	Fall	1
Aster chilensis	One gallon pot from seed	Fall	1-2

TABLE 14
List of Propagule or Nursery Stock to be Planted in Reach 3
(continued)

Scientific Name	Propagule Type and Nursery Stock Size	Collection Time	Collection Time Prior to Planting (Years)
Baccharis douglasii	One gallon pot from seed	Fall	1
Euthamia occidentalis (Solidago o.)	One gallon pot from seed	Fall	1
Glycyrrhiza lepidota	One gallon pot from seed, root cuttings, or rhizomes	Summer/ Fall	1-2
Leymus triticoides (Elymus t.)	Divisions	Fall	1
* Plant protection is required for these species to prevent browsing.			

TABLE 15
List of Noxious Weeds Potentially Occurring at Reach 3

Common Name	Scientific Name
Tree of Heaven	*Ailanthus altissima*
Giant Reed	*Arundo donax*
Slender wild oats	*Avena barbata*
Wild oats	*Avena fatua*
Common beet	*Beta vulgaris*
Ripgut grass	*Bromus diandrus*
Fox-tail chess	*Bromus rubens*
Hoary cress	*Cardaria draba*
Italian thistle	*Carduus pycnocephalus*
Starthistle	*Centaurea spp.*
Bull thistle	*Cirsium vulgare*
Poison hemlock	*Conium maculatum*
Bindweed	*Convolvulus arvensis*
Horseweed	*Conyza canadensis*
Jubata grass	*Cortaderia jubata*
Bermuda grass	*Cynodon dactlyon*
Turkey mullein	*Eremocarpus setigerus*
Ficus	*Ficus carica*
Jimson weed	*Datura stramonium*
Teasel	*Dipsacus fullonum*
Sweet fennel	*Foeniculum vulgare*
English ivy	*Hedera helix*
Prickly lettuce	*Lactuca serriola*
Dittander	*Lepidium latifolium*
Italian ryegrass	*Lolium multiflorum*
English ryegrass	*Lolium perenne*
Bull mallow	*Malva nicaeensis*
White sweet-clover	*Melilotus albus*
Yellow sweet-clover	*Melilotus indicus*

TABLE 15
List of Noxious Weeds Potentially Occurring at Reach 3
(continued)

Common Name	Scientific Name
Tree tobacco	*Nicotiana glauca*
Prickly ox-tounge	*Picris echioides*
Smilo grass	*Piptatherum (Oryzopsis) miliacea*
Wild radish	*Raphanus sativus*
Castor bean	*Ricinis communis*
Black locust	*Robinia pseudoacacia*
Himalaya berry	*Rubus procerus*
Curly Dock	*Rumex crispus*
Russian thistle	*Salsola kali var. tenuifolia*
German Ivy	*Senecio mikanioides*
Milk thistle	*Silybum marianum*
Small-flowered nightshade	*Solanum nodiflorum*
Sow thistle	*Sonchus oleraceus*
Elm	*Ulmus spp.*
Periwinkle	*Vinca major*
Cocklebur	*Xanthium strumarium canadense*
Clotbur	*Xanthium spinosum*

TABLE 16
Short- and Long-Term Monitoring Activities for Reach 3

Monitoring Activity	Years																			
	Establishment Period					Long-Term Monitoring														
	1	2	3	4	5	6	7	8	9	10	15	25	35	45	55	65	75	85	95	100
Vegetation																				
Survival (T/S)*	X	X	X	X	X															
Vigor (T/S)	X	X	X	X	X															
Structure (T/S)	X	X	X	X	X															
Browse (T/S)	X	X	X	X	X															
Regeneration (T/S)	X	X	X	X	X															
Average Absolute Middle to Upper Canopy Percent Cover (T/S)				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Qualitative Evaluation								X												
Photodocumentation	2X	2X	2X	2X	2X															
Hydrology																				
Jurisdictional Habitat					X															
Groundwater Monitoring	X	X	X	X	X															
Wildlife																				
Point Counts					2/M					2/M	2/M	2/M	2/M	2/M	2/M	2/M	2/M	2/M	2/M	2/M
Mist Net Surveys					W					W	W	W	W	W	W	W	W	W	W	W
Breeding Bird Census					F-J					F-J	F-J	F-J	F-J	F-J	F-J	F-J	F-J	F-J	F-J	F-J
Mammal, Reptile, and Amphibian Surveys					Q					Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q

TABLE 16
Short- and Long-Term Monitoring Activities for Reach 3

Monitoring Activity	Years																			
	Establishment Period					Long-Term Monitoring														
	1	2	3	4	5	6	7	8	9	10	15	25	35	45	55	65	75	85	95	100
Fisheries																				
Check Replacement Spawning Gravels+	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Spawning Riffle Utilization+	O-A	O-A	O-A	O-A	O-A	O-A	O-A	O-A	O-A	O-A	O-A	O-A	O-A	O-A	O-A	O-A	O-A	O-A	O-A	O-A
Structural Inspection by Engineer	Annual prior to September 1 throughout life of project.																			
Visual Check for Debris++	Biweekly October through March throughout life of project.																			
Adult Anadromous Fish Surveys+,++	O-A	O-A	O-A	O-A	O-A	O-A	O-A	O-A	O-A	O-A	O-A	O-A	O-A	O-A	O-A	O-A	O-A	O-A	O-A	O-A
Stream Channel Modifications—Visual Inspection	Annual throughout life of project.																			

F-J = Monthly, February through July
M = Monthly
O-A = Monthly, October to April
Q = Quarterly
S = Shrub
T = Tree
W = Weekly
2/M = Two times per month
2X = spring, fall
*Monitoring efforts would switch from survival counts to canopy cover measurement at approximately years 3 or 4.
**No monitoring activities are to occur in years 6 through 9 other than yearly site assessments. Abnormal site conditions may trigger additional monitoring.
+ = After year 10, the frequency of these tasks can be reduced to once every 5 years or any other frequency with concurrence from CDFG.
++ = Frequently can be reduced if there have been no storm events since last inspection. See text for details.

TABLE 17
Number of Transects Required for Vegetation Monitoring in Reach 3

Revegetation Site	Number of Transects	Number of Samples
Site 3	3	108
Site 4	3	108
Site 5	2	72
Site 6	3	108
Site 7	2	72
Site 8	2	72
Site 9	1.5	54

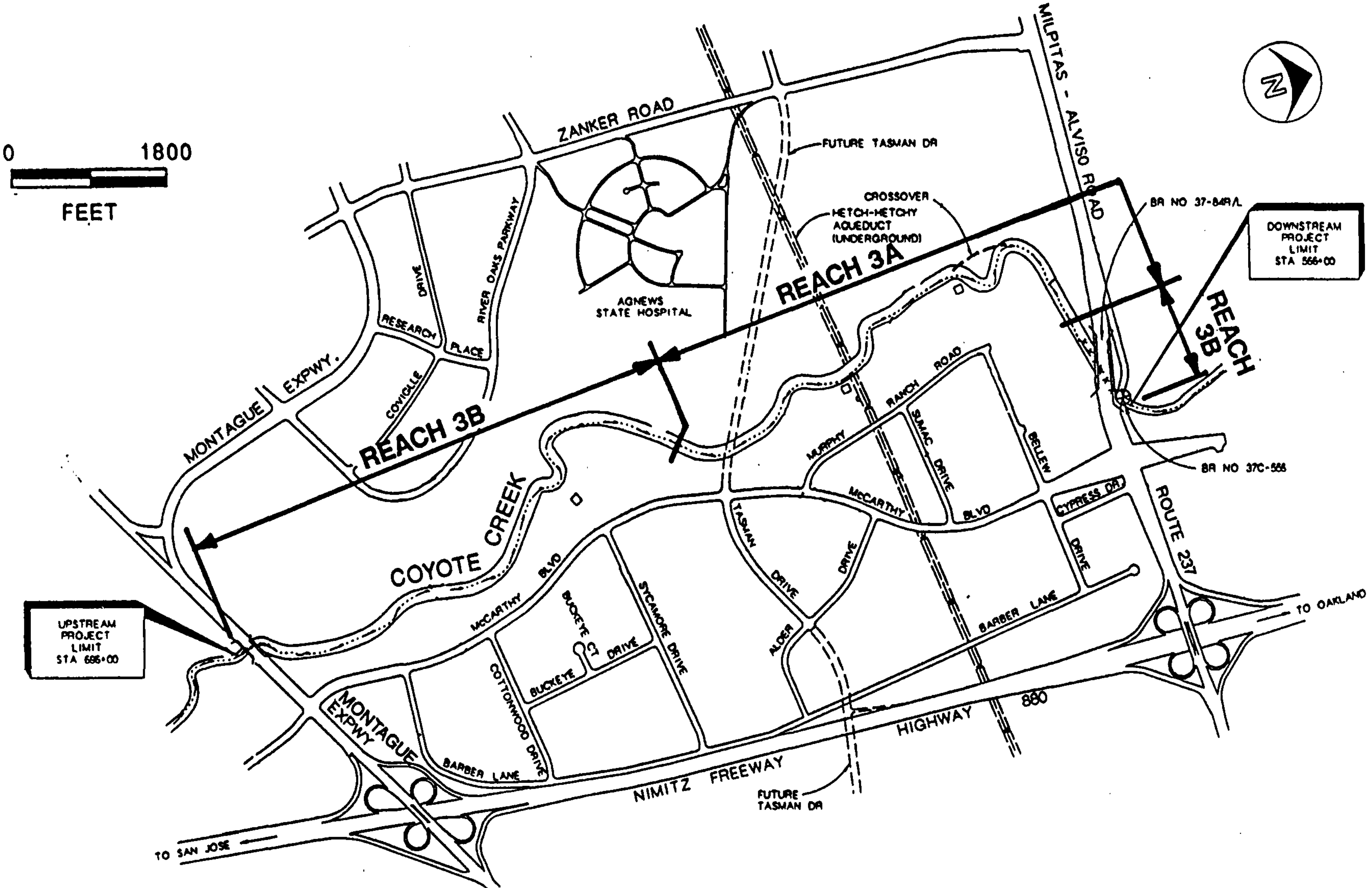


Figure 1
LIMIT OF REACHES 3A AND 3B OF COYOTE CREEK

Mitigation and Monitoring Program
Reach 3 of Coyote Creek
Santa Clara Valley Water District
May 1994

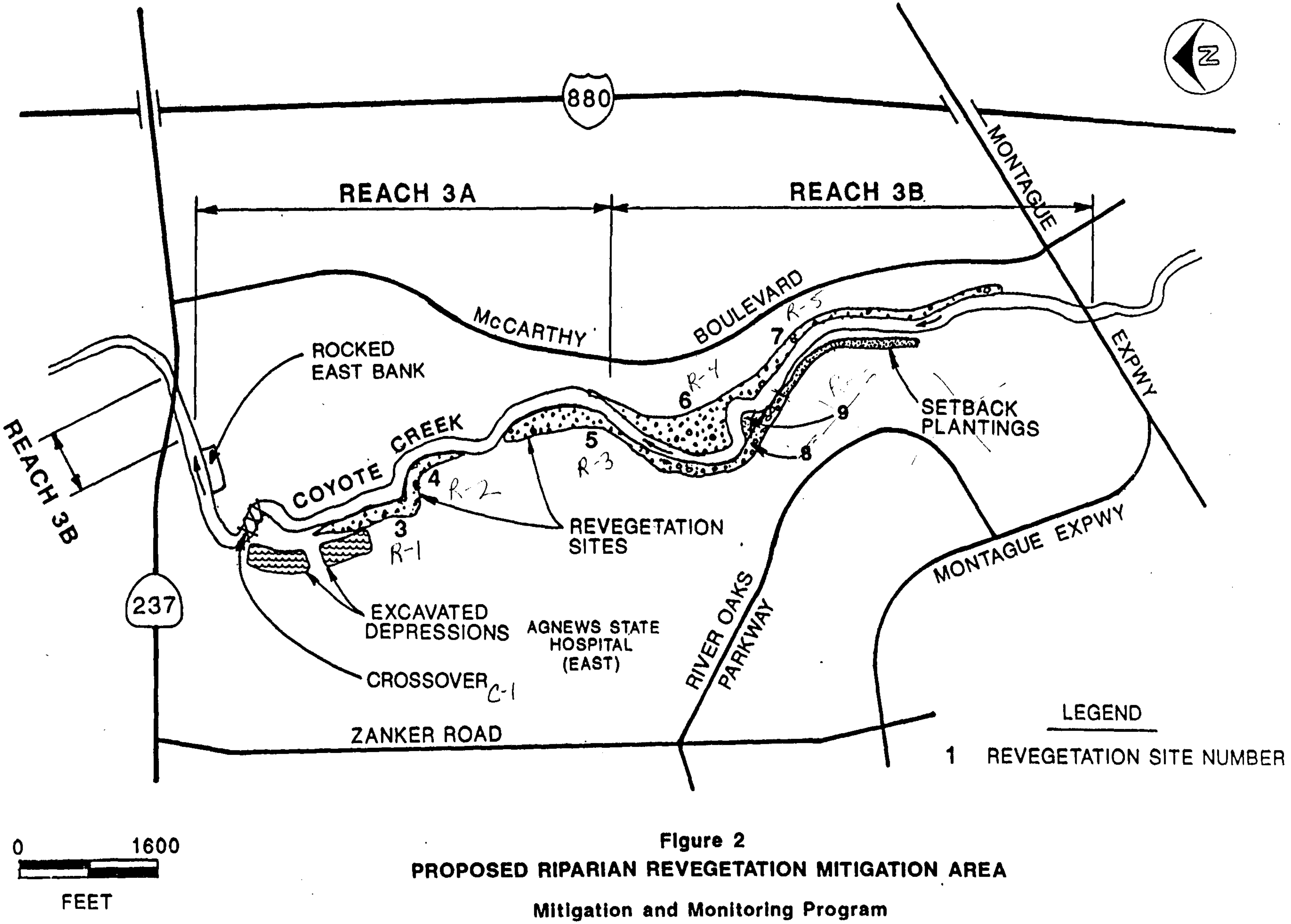


Figure 2
PROPOSED RIPARIAN REVEGETATION MITIGATION AREA

Mitigation and Monitoring Program
Reach 3 of Coyote Creek
Santa Clara Valley Water District
May 1994

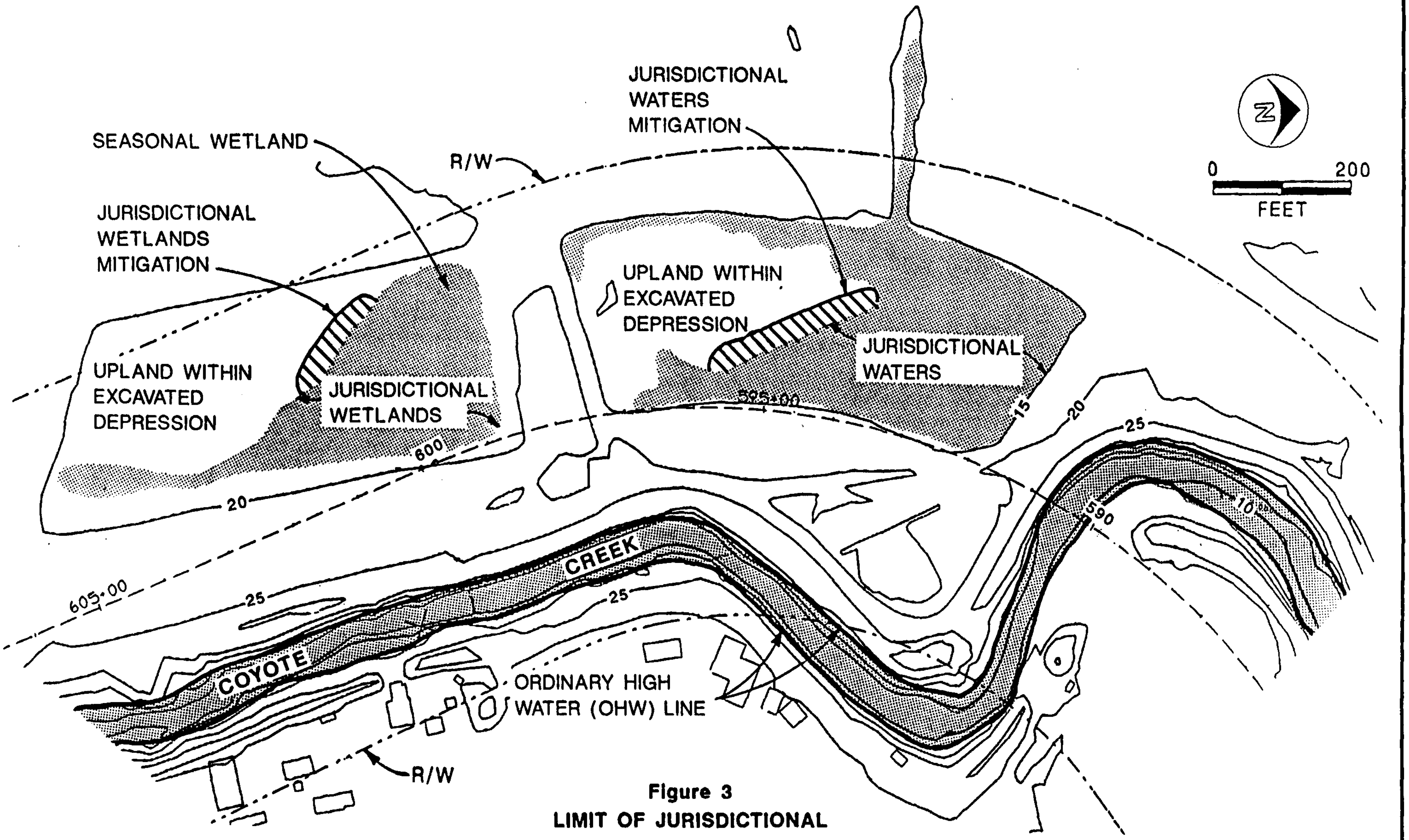

SEASONAL WETLAND
R/W
JURISDICTIONAL WATERS MITIGATION
N
0 200
FEET
JURISDICTIONAL WETLANDS MITIGATION
UPLAND WITHIN EXCAVATED DEPRESSION
UPLAND WITHIN EXCAVATED DEPRESSION
JURISDICTIONAL WATERS
JURISDICTIONAL WETLANDS
595+00
600
15
20
25
20
605+00
25
25
CREEK
COYOTE
590
10
ORDINARY HIGH WATER (OHW) LINE
R/W

Figure 3
LIMIT OF JURISDICTIONAL WATERS AND WETLANDS AT THE CROSSOVER AREA

Mitigation and Monitoring Program
Reach 3 of Coyote Creek
Santa Clara Valley Water District
May 1994

LEGEND:
R/W RIGHT-OF-WAY
▨ JURISDICTIONAL WATERS WITHIN COYOTE CREEK

CH2M HILL

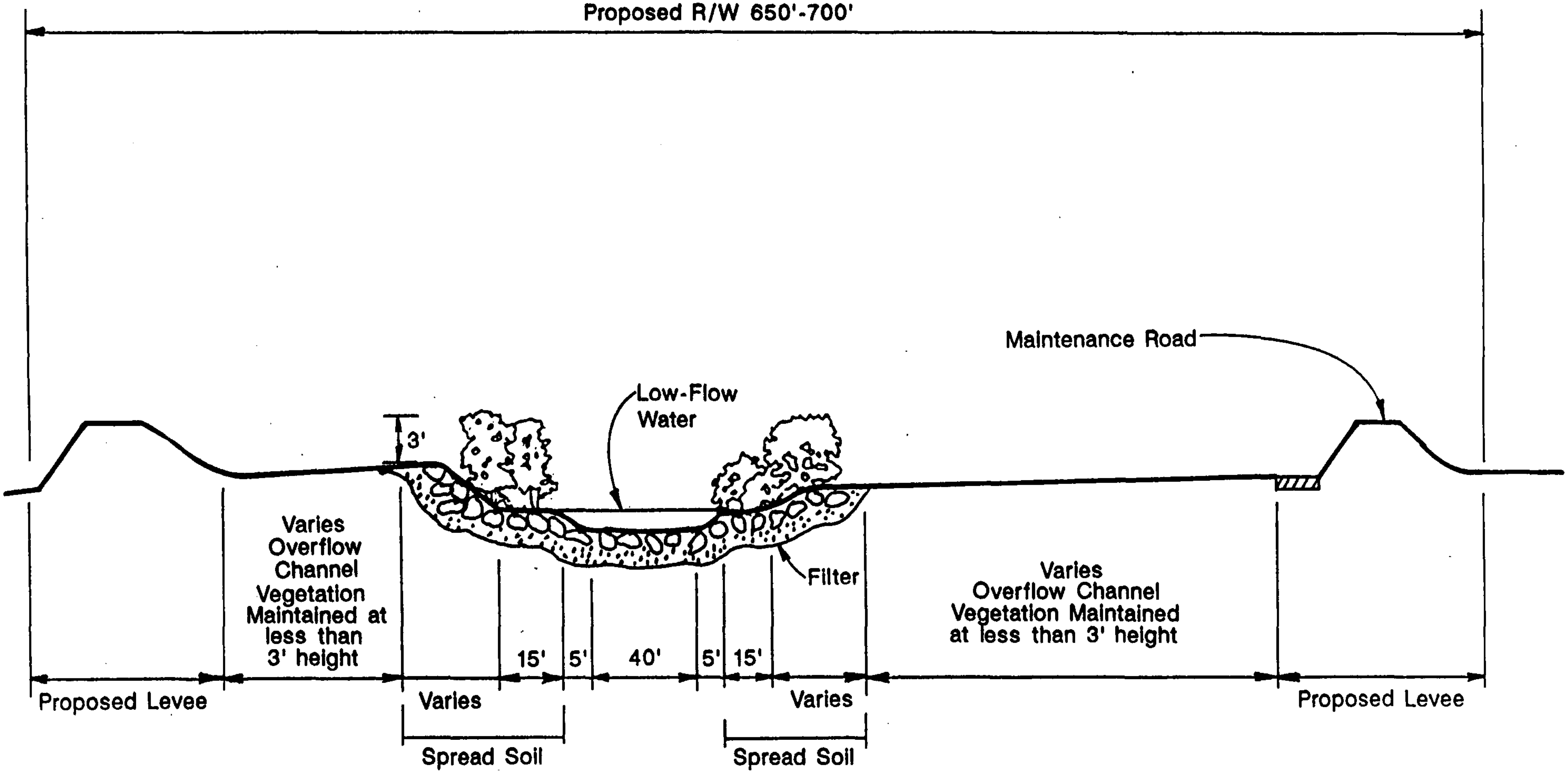
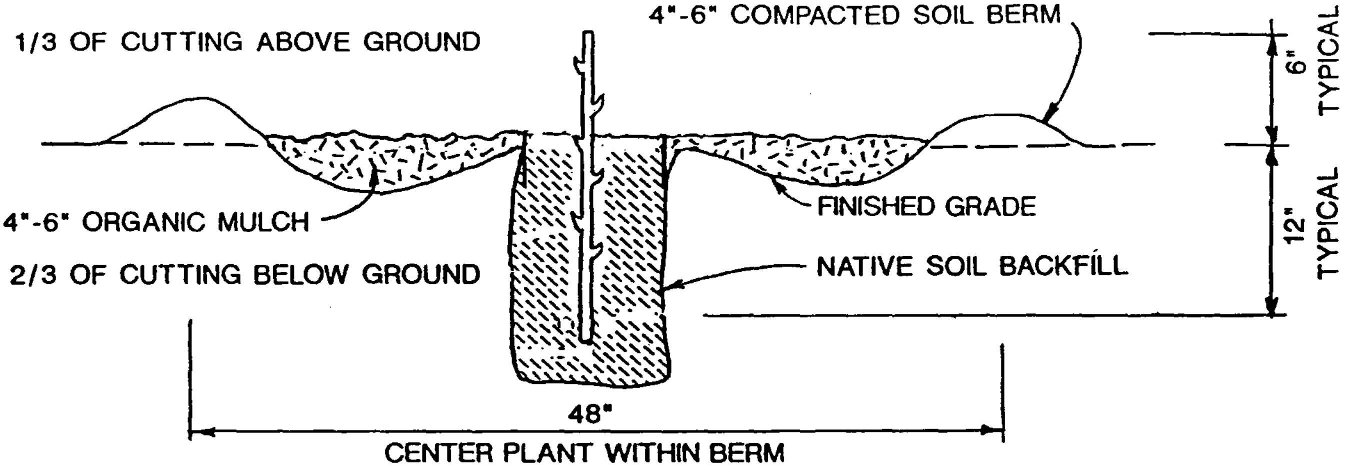

Proposed R/W 650'-700'
Maintenance Road
Low-Flow Water
3'
Filter
Varies Overflow Channel Vegetation Maintained at less than 3' height
Varies Overflow Channel Vegetation Maintained at less than 3' height
15'
5'
40'
5'
15'
Proposed Levee
Varies
Varies
Proposed Levee
Spread Soil
Spread Soil

Figure 4

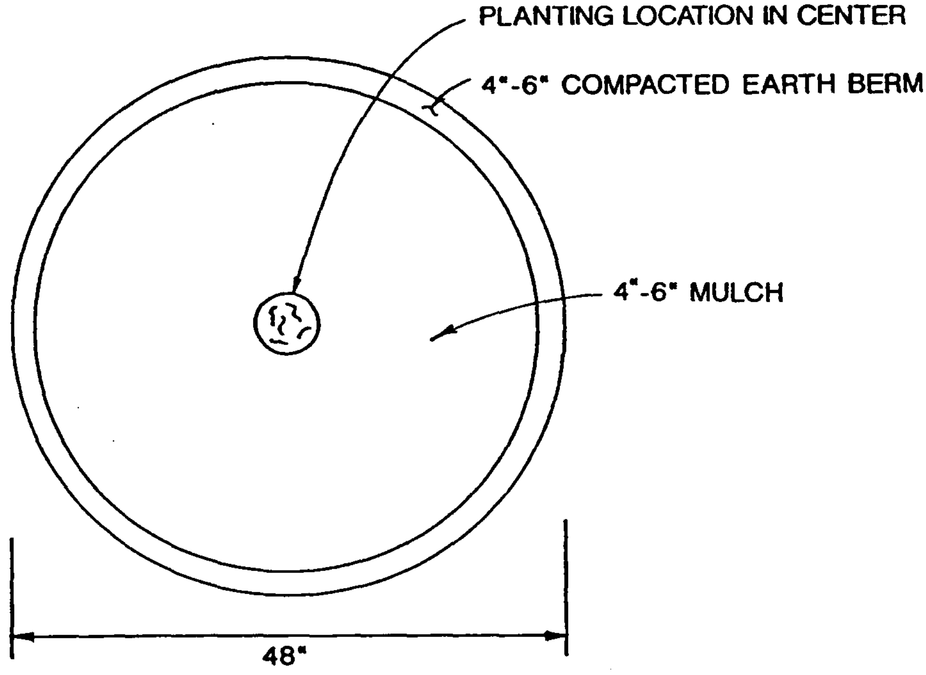
CROSSOVER AREA PLANTING DETAIL STATION 590 TO 595

Mitigation and Monitoring Program
Reach 3 of Coyote Creek
Santa Clara Valley Water District
May 1994



SECTION
Not To Scale

*CUTTING SHOULD BE 3/4" IN DIAMETER



PLAN VIEW
Not To Scale

*SUITABLE FOR LEVEL GROUND AND SLOPES

Figure 5
INSTALLATION OF CUTTINGS

Mitigation and Monitoring Program
Reach 3 of Coyote Creek
Santa Clara Valley Water District
May 1994

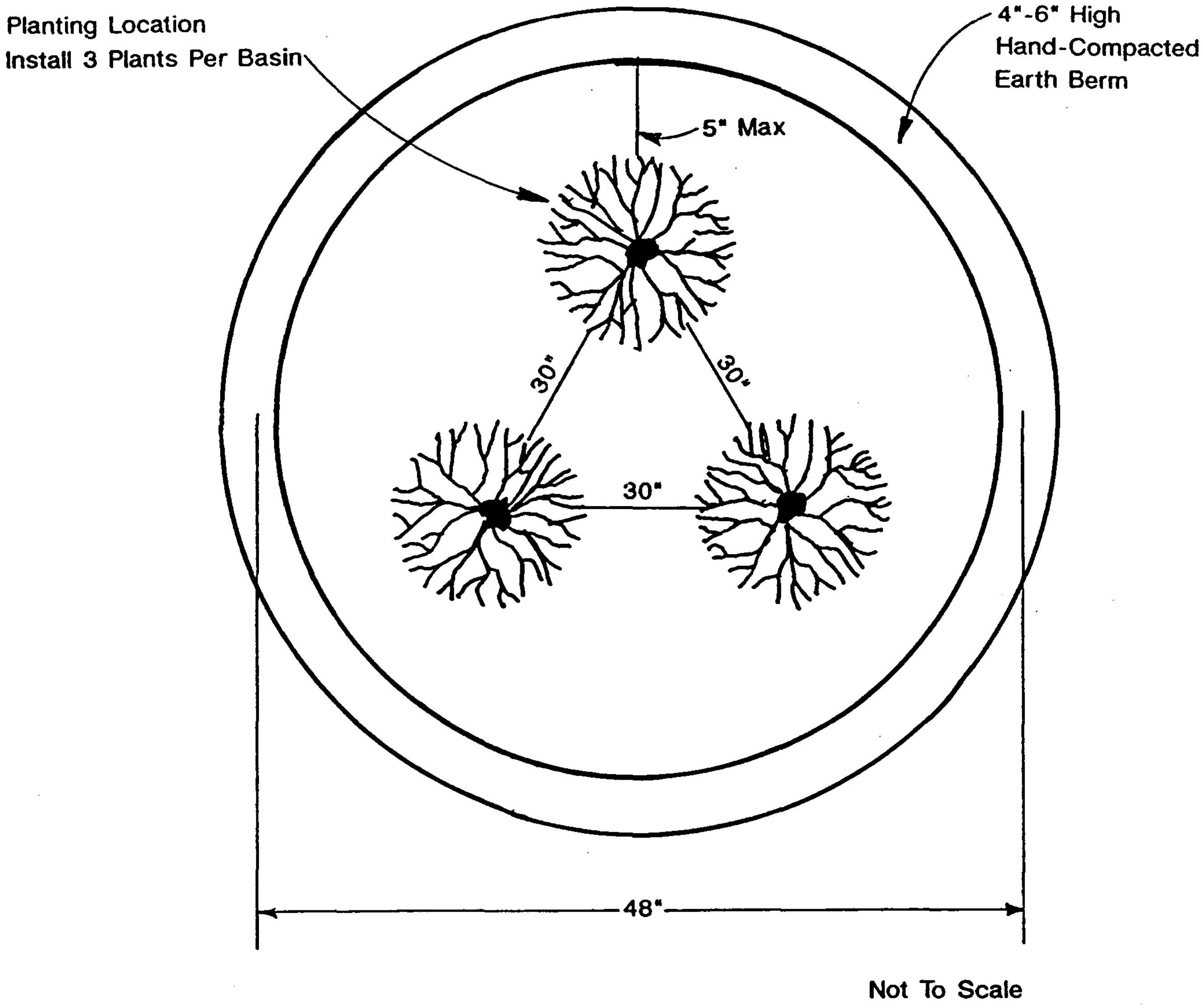
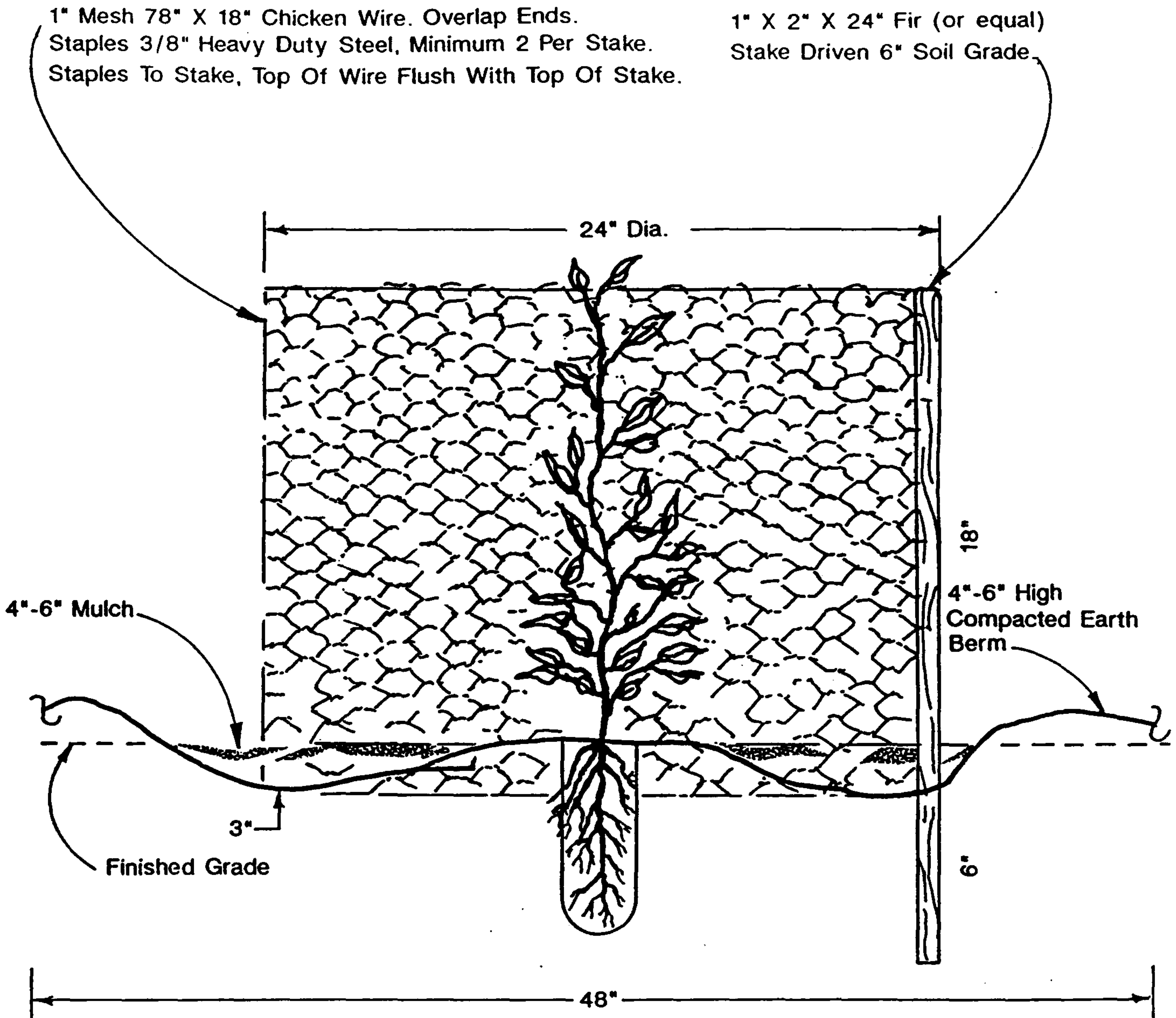


Figure 6
TRIPLE PLANTING OF HERBACEOUS STOCK

Mitigation and Monitoring Program
Reach 3 of Coyote Creek
Santa Clara Valley Water District
May 1994



1" Mesh 78" X 18" Chicken Wire. Overlap Ends.
Staples 3/8" Heavy Duty Steel, Minimum 2 Per Stake.
Staples To Stake, Top Of Wire Flush With Top Of Stake.
1" X 2" X 24" Fir (or equal)
Stake Driven 6" Soil Grade
24" Dia.
18"
4"-6" Mulch
4"-6" High
Compacted Earth
Berm
3"
Finished Grade
6"
48"

* NOTE: Suitable For Either Container Plants Or Cutting.

Not To Scale

Figure 7
CHICKEN WIRE PLANT PROTECTION
AND CONTAINER STOCK PLANTING DETAIL

Mitigation and Monitoring Program
Reach 3 of Coyote Creek
Santa Clara Valley Water District
May 1994

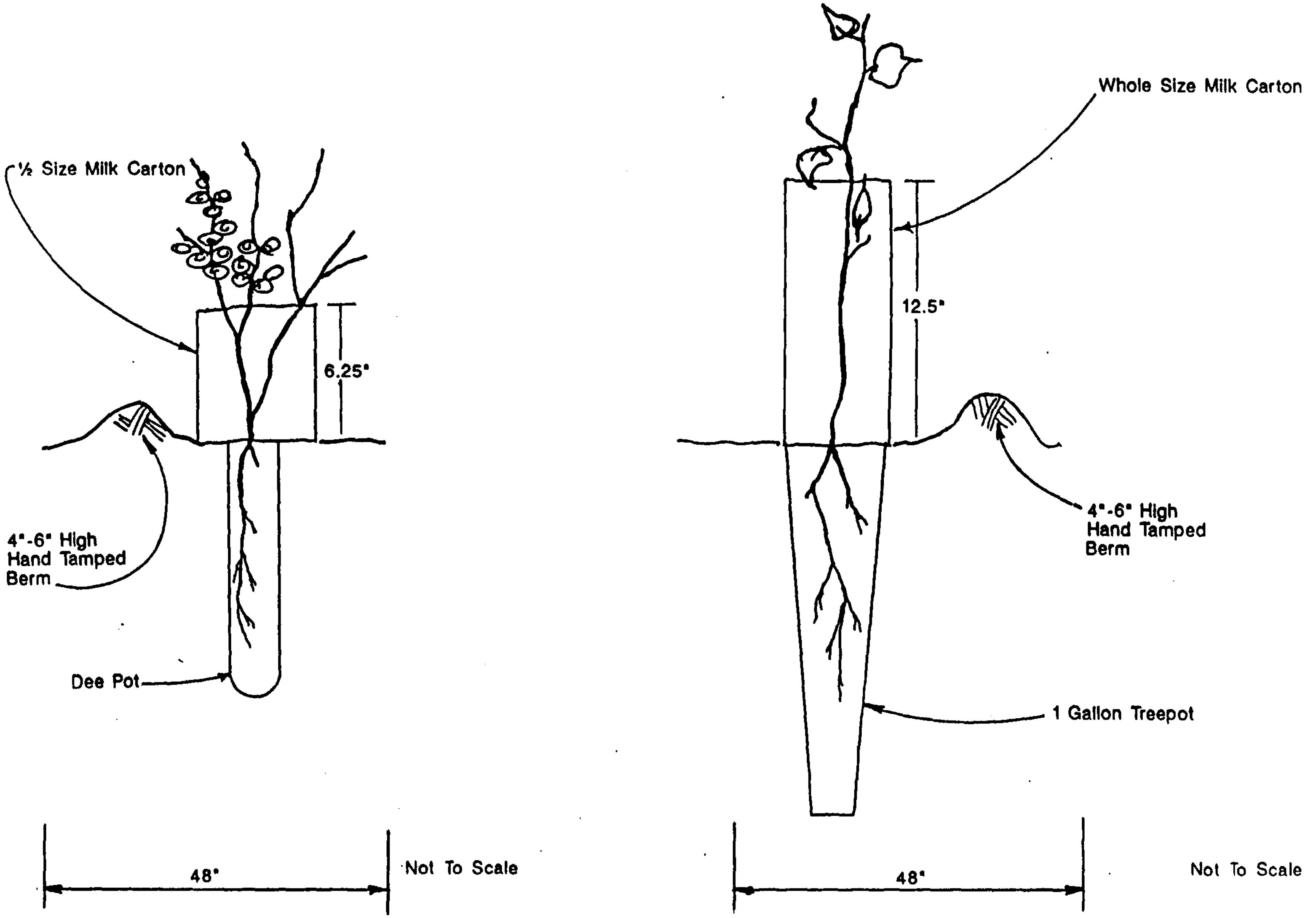
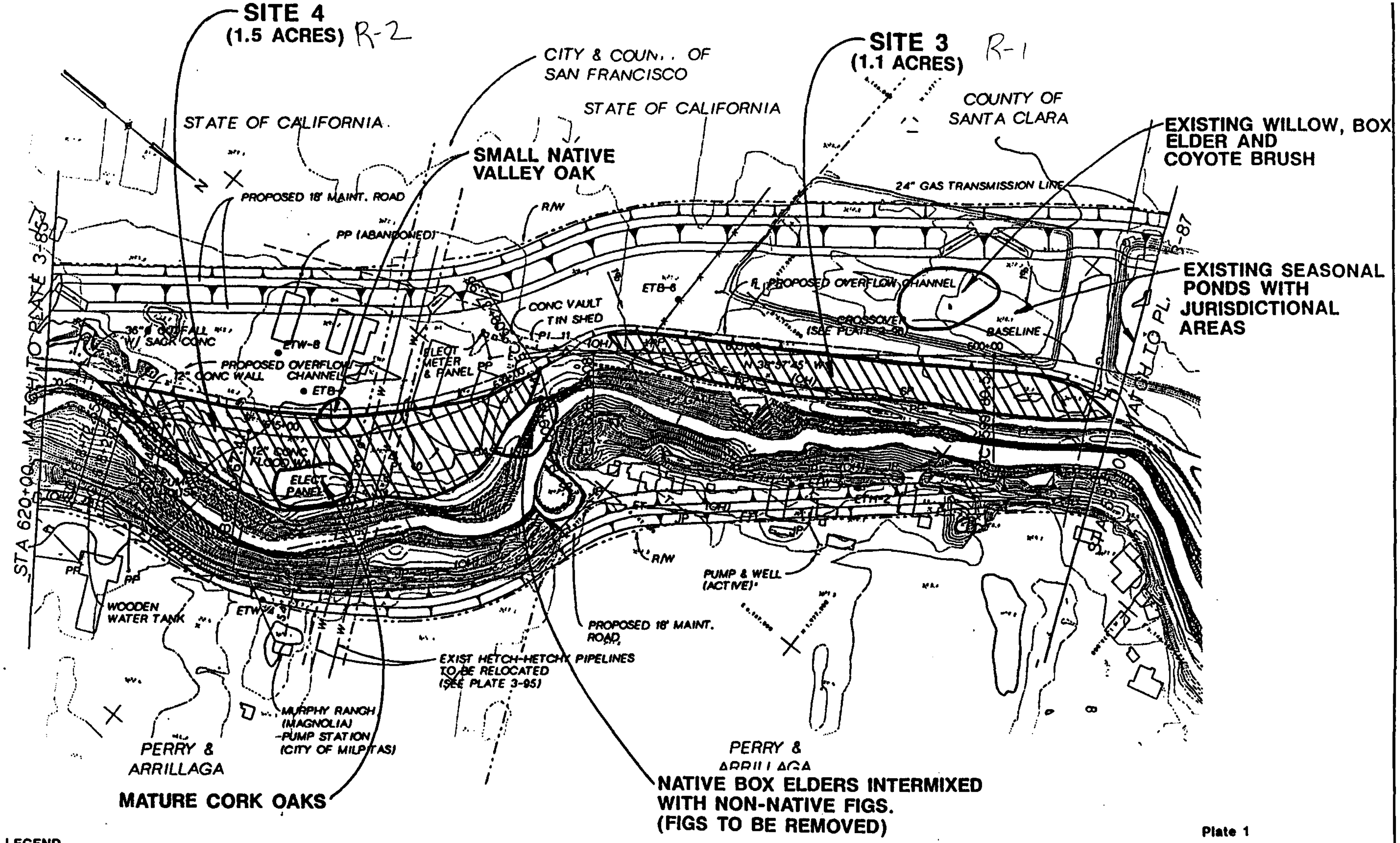


Figure 8
MILK CARTON PLANT PROTECTION DEVICES

Mitigation and Monitoring Program
Reach 3 of Coyote Creek
Santa Clara Valley Water District
May 1994



LEGEND

▨ Proposed revegetation sites

GRAPHIC SCALE

0 50' 100' 200' 300' 400' 500'

1" = 200'

Plate 1
PROPOSED REVEGETATION SITES
AND SIGNIFICANT FEATURES

Mitigation and Monitoring Program
Reach 3 of Coyote Creek
Santa Clara Valley Water District
May 1994

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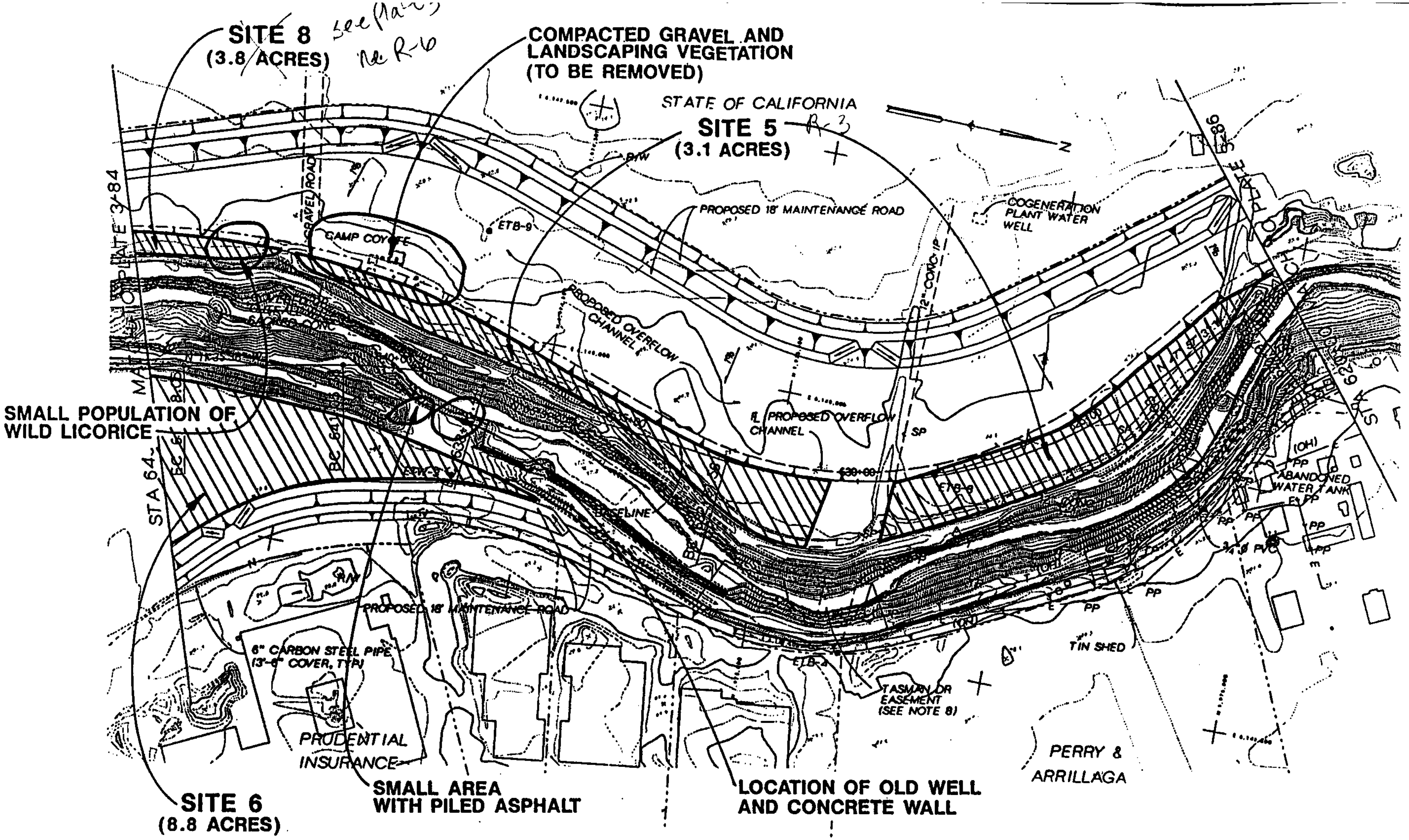

SITE 8
(3.8 ACRES)
see Plans re R-6
COMPACTED GRAVEL AND LANDSCAPING VEGETATION (TO BE REMOVED)
STATE OF CALIFORNIA
SITE 5
(3.1 ACRES)
R-3
N
GRAVEL ROAD
CAMP COYOTE
ETB-9
PROPOSED 18' MAINTENANCE ROAD
COGENERATION PLANT WATER WELL
PROPOSED OVERFLOW CHANNEL
PROPOSED OVERFLOW CHANNEL
12" CONC IP
SP
STA 64
STA 62+00
SMALL POPULATION OF WILD LICORICE
ETB-8
(OH)
PP
ABANDONED WATER TANK
PVC
BASELINE
PROPOSED 18' MAINTENANCE ROAD
6" CARBON STEEL PIPE (3'-6" COVER, TYP)
TIN SHED
ETB-2
TASMAN DR EASEMENT (SEE NOTE 8)
PRUDENTIAL INSURANCE
PERRY & ARRILLAGA
SITE 6
(8.8 ACRES)
SMALL AREA WITH PILED ASPHALT
LOCATION OF OLD WELL AND CONCRETE WALL

LEGEND

▨	Proposed revegetation sites

GRAPHIC SCALE

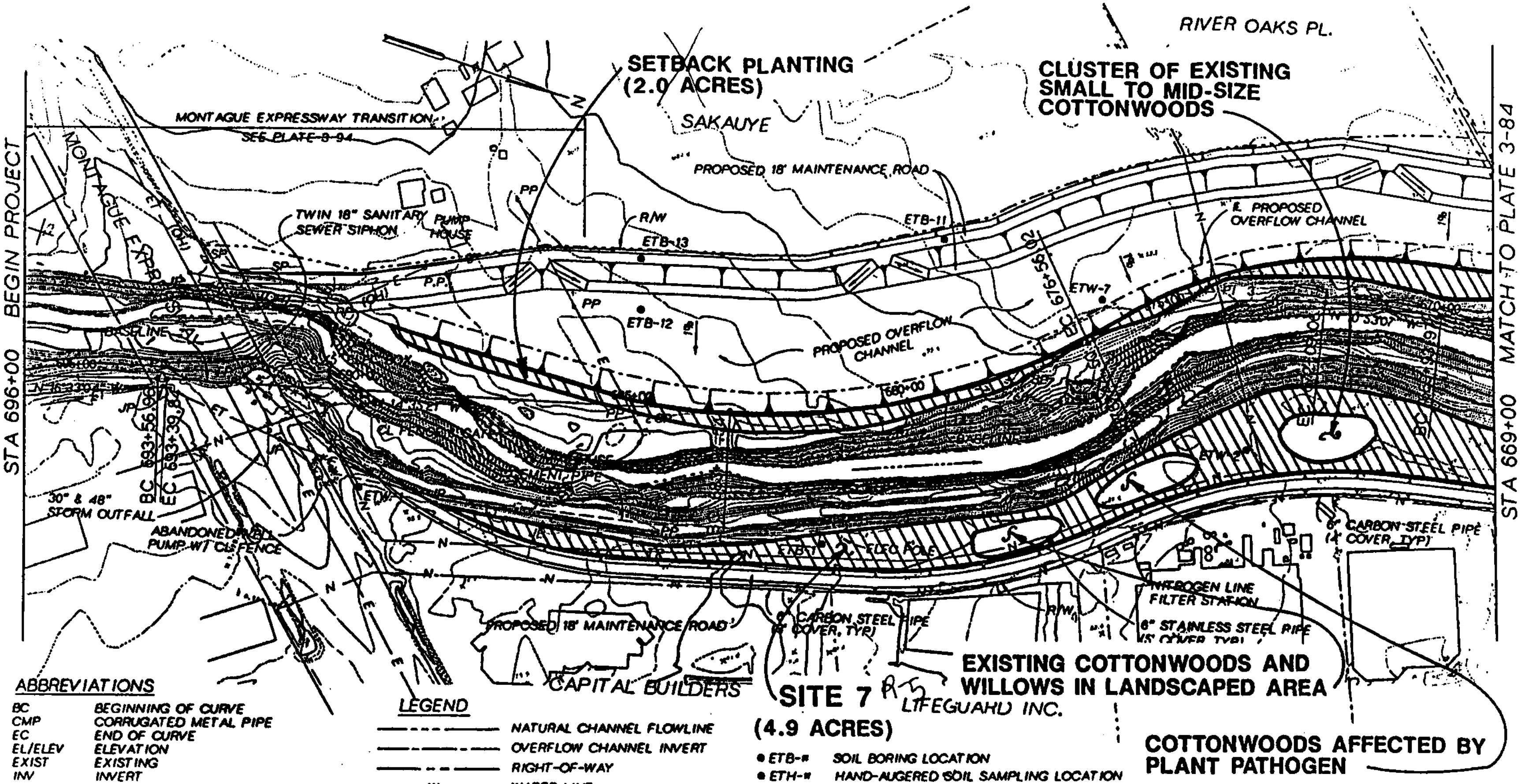
1" = 200' 0 50' 100' 200' 300' 400' 500'

Plate 2
PROPOSED REVEGETATION SITES AND SIGNIFICANT FEATURES

Mitigation and Monitoring Program
Reach 3 of Coyote Creek
Santa Clara Valley Water District
May 1994

BAW35901.MM.FR

CH2M HILL



RIVER OAKS PL.
SETBACK PLANTING (2.0 ACRES)
CLUSTER OF EXISTING SMALL TO MID-SIZE COTTONWOODS
MONTAGUE EXPRESSWAY TRANSITION
SEE PLATE 3-94
SAKAUYE
PROPOSED 18' MAINTENANCE ROAD
BEGIN PROJECT
STA 696+00
MATCH TO PLATE 3-84
STA 669+00
MONTAGUE EXP.
TWIN 18" SANITARY SEWER SIPHON
PUMP HOUSE
R/W
ETB-13
ETB-11
ETB-12
ETW-7
℄ PROPOSED OVERFLOW CHANNEL
PROPOSED OVERFLOW CHANNEL
EC 676+56.02
680+00
BASELINE
BC 693+56.96
EC 693+39.83
30" & 48" STORM OUTFALL
ABANDONED WELL PUMP W/ CL FENCE
6" CARBON STEEL PIPE (4' COVER, TYP)
NITROGEN LINE FILTER STATION
6" STAINLESS STEEL PIPE (5' COVER, TYP)
ETB-1
ELEC POLE
CARBON STEEL PIPE (4' COVER, TYP)
PROPOSED 18' MAINTENANCE ROAD
CAPITAL BUILDERS
SITE 7
(4.9 ACRES)
LIFEGUARD INC.
EXISTING COTTONWOODS AND WILLOWS IN LANDSCAPED AREA
COTTONWOODS AFFECTED BY PLANT PATHOGEN

ABBREVIATIONS

BC	BEGINNING OF CURVE
CMP	CORRUGATED METAL PIPE
EC	END OF CURVE
EL/ELEV	ELEVATION
EXIST	EXISTING
INV	INVERT
NGVD	NATIONAL GEODETIC VERTICAL DATUM
NTS	NOT TO SCALE
MH	MANHOLE
PI	POINT OF INTERSECTION
RW	RIGHT-OF-WAY
STA	STATION
PP	POWER POLE
TP	TELEPHONE POLE
JP	JOINT POLE
OH	OVERHEAD
SP	STAND PIPE
IP	IRRIGATION PIPE
CL	CHAIN LINK
CONC	CONCRETE

LEGEND

▨	Proposed revegetation sites

LEGEND

——— - - - ———	NATURAL CHANNEL FLOWLINE
——— - — - ———	OVERFLOW CHANNEL INVERT
——— - - ———	RIGHT-OF-WAY
——— W ———	WATER LINE
——— G ———	GAS LINE
——— T ———	TELEPHONE LINE
——— E ———	ELECTRIC LINE
——— N ———	NITROGEN GAS LINE
——— ET ———	ELECTRIC & TELEPHONE LINE
—X——X—	CHAIN LINK FENCE
——— SD ———	STORM DRAIN LINE
△	POINT OF INTERSECTION (PI)
- - - - - - - - -	EXIST EASEMENT

● ETB-#	SOIL BORING LOCATION
● ETH-#	HAND-AUGERED SOIL SAMPLING LOCATION
● ETW-#	MONITORING WELL

GENERAL NOTES (PLATES 3-83 THRU 3-88):

1. ELEVATIONS REFER TO THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 AND ARE BASED ON SANTA CLARA VALLEY WATER DISTRICT BENCH MARKS: 64 AND 347 AND NGS BENCH MARKS G-148 AND COYOTE.

CITY OF MILPITAS

GRAPHIC SCALE

1" = 200' 0 50' 100' 200' 300' 400' 500'

Plate 4
PROPOSED REVEGETATION SITES
AND SIGNIFICANT FEATURES

Mitigation and Monitoring Program
Reach 3 of Coyote Creek
Santa Clara Valley Water District
May 1994

CH2M HILL

BAW35901.MM.FR

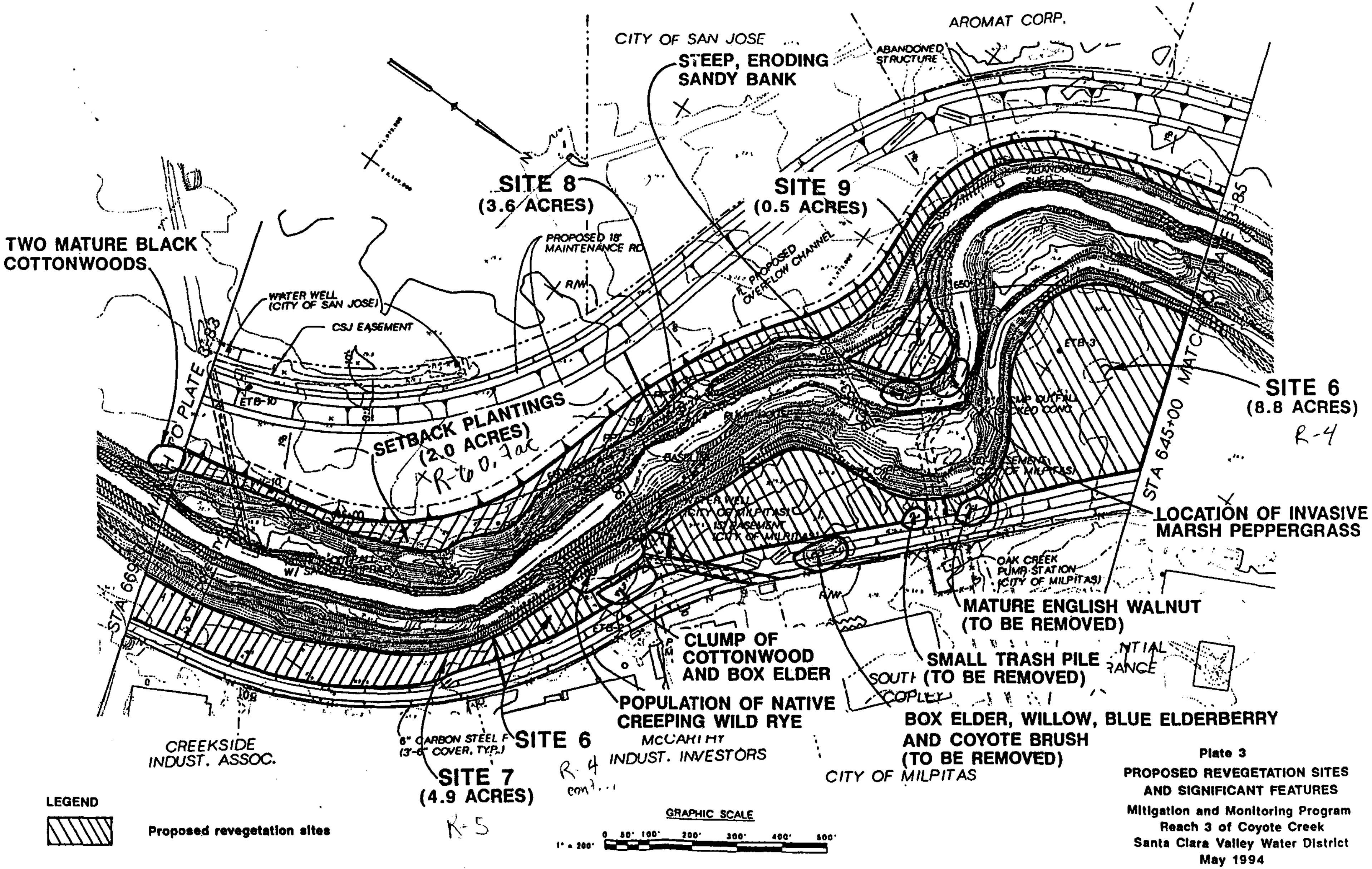

AROMAT CORP.
CITY OF SAN JOSE
ABANDONED STRUCTURE
STEEP, ERODING SANDY BANK
SITE 8
(3.6 ACRES)
SITE 9
(0.5 ACRES)
PROPOSED 18' MAINTENANCE RD
PROPOSED OVERFLOW CHANNEL
ABANDONED SHED
TWO MATURE BLACK COTTONWOODS
WATER WELL (CITY OF SAN JOSE)
CSJ EASEMENT
R/W
ETB-10
ETB-3
TO PLATE 3
SETBACK PLANTINGS
(2.0 ACRES)
R-6 0.7ac
SITE 6
(8.8 ACRES)
R-4
STA 645+00
MATCH LINE
LOCATION OF INVASIVE MARSH PEPPERGRASS
OAK CREEK PUMP STATION (CITY OF MILPITAS)
MATURE ENGLISH WALNUT (TO BE REMOVED)
CLUMP OF COTTONWOOD AND BOX ELDER
SMALL TRASH PILE (TO BE REMOVED)
POPULATION OF NATIVE CREEPING WILD RYE
BOX ELDER, WILLOW, BLUE ELDERBERRY AND COYOTE BRUSH (TO BE REMOVED)
STA 669
CREEKSIDE INDUST. ASSOC.
6" CARBON STEEL P (3'-6" COVER, TYP.)
SITE 6
R-4 con't...
SITE 7
(4.9 ACRES)
R-5
McCARTHY INDUST. INVESTORS
CITY OF MILPITAS
LEGEND
▨ Proposed revegetation sites
GRAPHIC SCALE
0 50' 100' 200' 300' 400' 500'
1" = 200'

Plate 3

PROPOSED REVEGETATION SITES AND SIGNIFICANT FEATURES

Mitigation and Monitoring Program
Reach 3 of Coyote Creek
Santa Clara Valley Water District
May 1994